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Use of Body Measurements in the School Health Program*

Part I. General Considerations and the Selection of Measurements

HAROLD C. STUART, M.D., F.A.P.H.A., AND
HOWARD V. MEREDITH, PH.D.

Department of Maternal and Child Health, Harvard School of Public Health, Harvard University, Boston; and Iowa Child Welfare Research Station, University of Iowa, Iowa City

BODY measurements may serve useful purposes as adjuncts to the medical examinations of school children. To fulfil such ends, however, they must be carefully taken and soundly interpreted in conjunction with other findings and in relation to what is known regarding normal occurrences. Without attention to these provisions, measuring children at school is a waste of time and may lead to unsound conclusions and unfortunate recommendations.

The principal purposes served by measurements have to do with appraisal of the physical state of the child at the time they are taken, and with the evaluation of his growth during the periods between examinations. In the former instance, measurements reënforce the physician's clinical observations as to the child's size, build, muscular development, and probable nutritional state. They help him to recognize the gross physical attributes in which a given child is unusual, and to record in relatively precise terms to what degree he deviates in these respects. Even if a child is not markedly atypical, it is possible to record the type of child he is with respect to size and build by relating his measurements to the normal range of individual variations encountered at his age. This kind of information may not have any special significance when first obtained, but it may become very helpful at subsequent examinations when compared with new data in leading to the recognition of unusual progress in growth.

Medical interest in recognizing that a child is small or thin or in other respects below what is characteristic for his age arises from the fact that in some instances these are the results of failure to make normal progress according to the individual's constitutional

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potentialities for growth. It does not follow, of course, that small size or slender build is *necessarily* an undesirable finding from the standpoints of health and fitness. In a parallel manner, the finding that a child is unusually large or otherwise advanced in development should attract attention because this *may* indicate rather special needs for the maintenance of optimum health. A clinician who has had extensive experience in the examination of children not infrequently becomes quite proficient at recognizing without the aid of measurements those children who are physically retarded or under par as well as those who are advanced or unbalanced in development. However, without the aid of measurements he cannot record these observations with sufficient precision to be able at a later date to show whether the child has or has not kept pace with expected progress or regained formerly lost ground.

Intensive studies during recent years have added considerably to our knowledge of how children grow and how individual members of any group may be expected to differ in body size, build, relative amounts of the different tissues, and rates of growth over given age periods.[1-3] Although children of the same age and sex differ among themselves greatly in these respects, the characteristics of variability within any large group are easily describable. Since Baldwin's early study,[4] much evidence has accumulated showing that the progress of growth during the childhood years is sufficiently orderly so that most children tend to maintain their position with respect to the group in any given measurement from year to year.[5] During the adolescent years the pattern of the growth curve usually is quite similar for children who differ greatly in size, although it shows wide individual variation in the timing of the periods of acceleration and deceleration. One of the authors has reported a major investigation on the growth of individuals during the adolescent years,[6] while the other author recently has reviewed the cumulative evidence to date pertaining to patterns of growth encountered in this period.[7] Familiarity with these studies should be extremely helpful to the physician charged with the responsibility of interpreting measurements.

Progress has not been so notable in developing reliable methods for determining the *causes* of variability in size, proportions, or growth progress. Measurements tell what a child is like and whether he has any unusual characteristics, but they do not tell why he is unusual. Furthermore, except in certain pathological instances (e.g., extreme deviations from the normal or typical syndromes of disease) much more knowledge is required relating to the immediate as well as the ultimate significance of atypical manifestations of size, build, and growth as these relate to health and physical fitness. Such light as can be thrown upon these questions at the present time comes only from a careful evaluation of measurements in conjunction with many other pertinent data derived from a comprehensive health history and thorough physical examination.

It is known that various environmental factors such as the nature of the diet, the habits of physical activity and the character and duration of certain illnesses may influence the progress of growth. It is the responsibility of the school physician to recognize, in so far as time and available methods permit, those children who may have been unfavorably affected by these environmental forces. In instances of suspected retardation, the factor or factors likely to have been involved should be thoroughly investigated and corrected to the fullest possible extent. In most cases the part played by one

or more of these can be determined only by noting the results obtained during periods of carefully maintained improvements in diet and hygiene. The use of body measurements in the follow-up of children whose regimes have been corrected may be of great value in revealing the effectiveness of such changes and thus in indicating whether constitutional or environmental factors were responsible primarily for the apparently inadequate development. With extreme variations, the endocrine balance deserves study and the child should be referred for careful medical appraisal and continuing observation.

When constitutional factors appear to explain small or large size, slender or stocky build, slow or rapid growth progress, interest in trying to change these characteristics may properly give way to attempts to organize the child's life on a basis of well poised acceptance of his traits and a regime suited to his particular needs. As this often requires guidance and provisions differing from those customarily adopted for children of his age, the findings become of interest to all the school personnel, and the understanding and coöperation of the latter will be required for best results.

Fortunately for our purposes the primary objective of the school health examination is to *discover* those children who are in poor or questionable physical health or nutritional state. The school physician is not charged with the task of undertaking intensive study in order to arrive at a final decision as to the significance to be attached to unusual or undesirable findings at examinations. His charge is to see that those children who might be well served by further investigation are recognized and referred elsewhere for this purpose. The problem in this connection, therefore, is to select the best available means for screening those children in any group who deviate sufficiently from the normal course of human growth to justify further study for the purpose of assuring appropriate care. However, in those instances in which diet or regime are suspect as causes for poor progress, the school program can do much to foster improvement in these respects, and efforts to improve these are not to be deprecated on the grounds that their relation to the specific findings has not been proved.

The questions which arise as to the use of measurements in connection with school health examinations may be considered under the following headings:

The selection of measurements
Procedures to be followed in taking measurements
The interpretation of measurement results
Norms to be used in making interpretations

THE SELECTION OF MEASUREMENTS

It is important in a school program to keep the list of recommended measurements as short as possible and to avoid the inclusion of those which are technically difficult to obtain. However, the time actually required to take five or six of the more straightforward measurements is little more than for two or three and, if the value of this phase of the examination can be appreciably enhanced thereby, the taking of the greater number is justified.

The attributes which ordinarily should be revealed by measurements are overall body size in length and mass and the relative amounts of the three principal body tissues which determine total mass, i.e., stockiness of the bony skeleton, bulkiness of the musculature, and quantity of skin and subcutaneous tissue.

Measurements should reveal the magnitudes of these attributes at the time of examination, and their relative values in terms of normal expectancies. They should also reveal actual increases and relative rates of increase in terms of the normal variability in the speed or magnitude of growth.

The best single measurement for registering gross linear size and rate of linear growth during the school years is stature. It is necessarily determined as recumbent length until the child is able to stand erect, and it is somewhat more accurately determined at all ages in this manner, but it is more conveniently and sufficiently reliably obtained in the school situation as standing height. General mass and overall rate of growth in mass are best measured as body weight.

Height and weight have long been measured routinely in connection with school health examinations, and weight alone has been relied upon to reveal the appropriateness of mass for length without other than clinical attention to its component parts. Some of the methods recommended for interpreting these two measurements in relation to each other will be referred to, but before considering their use it is necessary to call attention to their limitations. It must be remembered that height is only one aspect of size, and that the stockiness or linearity of skeletal build is only one factor in determining body weight.

Furthermore, body weight does not differentiate between the amount of protoplasmic tissue and the amount of fat or water stored in these tissues; nor does it distinguish between relatively inert tissues, such as bone, and active protoplasmic tissues, principally muscle. It is important to recognize that heavy weight for height and age may be due in one case to stocky bones, in another to exceedingly well developed muscles, in a third to large accumulations of subcutaneous fat, and in a fourth to a relatively well balanced amount of all of these. When a change occurs in weight for height and age, it is important to know which of these tissues has changed sufficiently to bring this about. During the school years it is particularly important to recognize when muscle development has not progressed satisfactorily or when loss of muscle tissue has occurred. These points require some elaboration in considering what measurements should be taken in addition to height and weight or, as an alternative, what clinical observations should be made before interpreting height and weight when other measurements are not obtained.

The stockiness of the bony skeleton is of interest in its own right, since it is one of the principal features of body build and since many of the characteristics of the physical growth of an individual are determined by the characteristics of build with which he is endowed. Moreover, it is of great importance in connection with the correct understanding of body weight. The appropriate weight for individuals of the same sex, age, and height, differs within very wide limits depending in large part upon the stockiness of the bony skeleton. It is unfortunately not possible to measure the stockiness of bones uninfluenced by overlying tissues except by means of x-ray photographs, for even in parts where muscles are small or absent, the amount of fat in the subcutaneous tissue affects the measurement obtained. However, pelvic breadth and chest circumference are two useful indicators of the degree of skeletal stockiness if allowance is made for unusual amounts of subcutaneous fat. Hence, pelvic breadth and chest circumference have been selected to supplement height in evaluating skeletal size and build, and are included among the measurements being recommended. However, the clinician must always take account of the influence of subcutaneous fat upon these measurements.

The size of the muscles has been referred to as an important attribute which must be taken into account both in its own right and for its proportionate influence on body weight. As in the case of the skeleton, the

musculature cannot be measured independently (e.g., free from the influence of variable amounts of bone and subcutaneous fat) except by x-ray. However, certain circumferences of the body vary principally with the amounts of muscle mass and subcutaneous fat, and the relative importance of the latter can be estimated clinically. Hence, the circumference of the calf has been added to the minimal list of recommended measurements. The shafts of the tibia and fibula in this region influence this measurement to a very small extent.

The quantity of subcutaneous tissue is an extremely important physical attribute, and a reliable measurement of this tissue would be very helpful. The quantity differs between the sexes and changes in a given sex with age in a very characteristic manner.[8, 1, 2] Furthermore, there are very persistent differences between individuals in the amount of this tissue customarily present, and the difference appears to be related in some measure to constitutional factors, among which type of build is undoubtedly an important one. Many aspects of growth, physical fitness and health appear to be related to the tendency to carry large or small amounts of subcutaneous tissue. In addition to these rather persistent characteristics, the amount of subcutaneous tissue depends to a considerable extent upon dietary habits and health occurrences and hence change in this amount may be an important indication of changes in nutritional state or in the storage and loss of fat or water in the tissues. Such change may less frequently suggest alterations in the activities of one or more of the endocrine glands.

Some years ago Franzen[9] recommended the use of a special spring caliper designed for measuring the thickness of the skin and subcutaneous tissue. This has not received general acceptance but has been found by some to be a helpful adjunct to the developmental examination. It is the writers' view that it would not lead to desirable results to recommend the use of this instrument unless the school physician and his assistants were willing to take sufficient time to become skilled in its application. Alternatively, it is advocated that in the minimal program the physician appraise the amount of this tissue by the method described in a later section on procedures. He must then take his ratings on this attribute into account in interpreting each of the measurements recommended (except stature) and in making his final evaluation of body build and nutritional state. This recommendation is made in the belief that in attempting to cultivate his powers of clinical appraisal the physician will go further toward reaching sound judgments in this matter than if he places reliance upon a procedure which is subject to technical error and with the use of which he or his assistants may not have an opportunity to become thoroughly proficient.

In conclusion, the writers recommend that as a minimum routine of anthropometry seven determinations be made as part of school health examinations. These include the five measurements already selected, namely, body weight, standing height, hip width, chest circumference, and leg girth, and careful subjective ratings of the thickness of two selected folds of skin and subcutaneous tissue.

In making these recommendations the authors do not wish to imply that other anthropometric methods are not useful or do not have certain advantages. To extract the greatest possible information from measurements, they should be evaluated in several different ways, and the more measurements taken, the greater the possibilities for exact description of the individual. The problem is one of selection, and the

authors have concluded that in the usual school situation the procedures recommended are as few and as readily carried out as the objectives of anthropometry require and that they are as likely to lead to a proper interpretation of a child's physical characteristics as any of equal simplicity that have come to their attention. It is recognized that under some circumstances less must be attempted and under others more should be undertaken. It is not possible to review the extensive literature dealing with this subject, but a few different methods of anthropometry which have been strongly recommended or are in common use in schools will be mentioned.

For use of height and weight only the most commonly used method is to refer weight to the average weight for sex, age, and height on tables such as those devised by Baldwin and Wood,[10] and to note the percentage deviation from this average. Manual,[11] Steggerda and Densen,[12] and others have constructed similar tables for use with particular racial groups. Since this method considers only sex, age, and height as factors which influence weight, and since average values only are given, the method has obvious limitations in respect to the objectives reviewed above. Tables set up in the same manner but giving a range of weights for each height have been presented by Faber.[13] These have the advantage of reminding the users that there is no single ideal weight for individuals of the same sex, age, and height. Jackson and Kelly[14] have prepared graphs which serve much the same purposes as those presented by the writers in so far as these two measurements are concerned. They do not provide for as exact placement within the range. Use is made of both the standard deviation and percentiles to express variance. This may be confusing to persons without statistical training.

Wetzel[15] has prepared a grid which provides for plotting measurements of height and weight on two graphs constructed on different principles from any thus far recommended to reveal unusual trends of growth.* Advanced mathematical training is required to understand the principles upon which this grid has been constructed, but any school assistant can quickly learn to

* The Wetzel Grid is designed to obtain from height and weight used conjointly evidence as to two distinct attributes of the child—the character of his physique or body build, and the rate or stage of his physical development. In the first graph, weight is plotted from the vertical and height from the horizontal scale, so that chronological age is not brought into the picture. A series of straight channels traverse this graph obliquely, each channel being designated by a letter. The left upper channels represent children of heavy, stocky build; the middle channels, children of more average build; and the lower right channels, thinner, lighter children. The line formed by the points representing repeated measurements of any child tends to follow one or other of the channels fairly consistently depending principally upon the child's physique or build. Wetzel states that this consistency is due to the fact that physique changes little during the school years. However, the first purpose of this graph is to recognize those children who move out of their appropriate channels because such occurrences are considered to reflect change in nutritional or health status. This implies that at any one examination channel position is determined both by build and by nutritional status, and the graph itself does not distinguish between them. Constancy in one channel is presumed to indicate that build is the predominant factor, whereas change of channel is strongly indicative that a nutritional or health factor is responsible. The graphs of two children, however, who remain continually in the same low right-hand channel may in one instance represent a well nourished, narrow-build child, and the other a chronically malnourished, average build child. The physician must determine by other means whether skeletal build, muscular development, or the amount of subcutaneous fat is the principal factor accounting for unusual channel position.

The second feature of the first graph on this grid is that transverse "developmental lines," which are numbered cross the lines forming the channels at intervals which represent equivalent developmental progress. Hence the developmental line reached by an individual's growth line represents his developmental level, and the distance covered in a given time is taken to be indicative of his rate or speed of development. In order to consider this developmental level in relation to chronological age, a second graph provides for plotting the developmental level from the vertical and the age from the horizontal scale. The curve formed for the individual on this graph is referred to as his "auxodrome." The background of this graph shows several curves which represent various percentiles in the normal distribution of "auxodromes." One may thus recognize whether an individual's developmental level is high or low in the normal distribution for age, and more particularly when the rate of his development becomes unusual or deviates from the expected course.

keep these records, and it requires very little study for a school physician to be able to select by inspection of them those children who are not progressing in the manner considered by the author to represent normal growth and development.

The curves produced by the plotted measurements on these graphs probably reflect those changes in the various aspects of a child's health and development which the author claims are revealed by them, but more information than height and weight is required in most instances before the significance of any unusual positions or deviations in these curves can be ascertained. One should therefore be guarded in drawing conclusions from the grid alone. This caution is necessary in respect to any method of interpreting measurements, but the greater the claims for a technical procedure, the more necessary it is to warn against undue reliance upon its use without careful reference to clinical findings. The Wetzel Grid will undoubtedly be found to serve several useful purposes in connection with school health examinations, provided the physician uses it thoughtfully in conjunction with careful evaluation of other data.

Wetzel has pointed out that the use of the percentile graph method of plotting heights and weights separately on an age basis fails to distinguish between intrinsic characteristics of size or build and relative advancement in development. It is not certain that this differentiation is validly portrayed by means of the grid, notwithstanding the fact that the grid does yield two expressions of height-weight relationships that are not obtained when height and weight are plotted separately against age. It is principally for this reason, however, that the use of both Wetzel Grids and percentile graphs for height and weight by age may be more informative than the use of either one alone. The writers do not believe that the use of the grid makes consideration of other measurements unnecessary for a satisfactory evaluation of physical status and physical progress or that the study of height and weight separately in relation to age has no additional value. The physician using the grid alone should at least observe the child carefully while interpreting it and should attempt to evaluate clinically the stockiness of the bony skeleton, the massiveness of the muscles, and the thickness of the subcutaneous tissue. Only in this way can he be certain what factors predominantly determine channel position. In using the Wetzel Grids, one not infrequently finds children who change grid channel without being able to obtain evidence either from history or on examination of nutritional or other health episodes which might be considered accountable. Such changes have been observed to occur in twins and in siblings at similar ages. These cases suggest that physique is not always constant during the school years, but that there may be individual or familial "preferential paths" which are sufficiently unusual to cause irregular progress in the grid channels.

Pryor[16] has prepared tables which give average weights for children in different categories of chest circumference and pelvic breadth as well as of height, age, and sex. This reference of a child to standards based upon children who are more like him in build (i.e., like him in chest circumference and hip width as well as height) tends to limit the range of expected variability in weight. It undoubtedly yields an expected weight which in many instances is a more appropriate one than that obtained from a height-weight table. The added time required for the use of these tables would seem to be justified, but the clinical evaluation of the various tissues is still required for proper interpretations as in using other methods.

The fact must not be overlooked that an obese child will have a larger chest circumference and a broader pelvic breadth than will an undernourished child, and hence the expected weight selected from these tables will be greater for the former than the latter. Thus with increasing obesity the weight considered appropriate for build will tend to rise, and with increasing malnutrition it will tend to fall.

McCloy[17] has published extensive studies relating to the appraisal of physical status. His procedure was that of investigating numerous measurements with reference to their relationships to each other and to other clinical data. On the basis of his studies he recommends a series of measurements for use in the school situation which includes the five selected by the writers and, in addition, the width of elbow or knee and the girths of upper arm, forearm, and thigh.* McCloy states, however, that "if part of the program must be sacrificed . . . retain the upper arm girth, and eliminate girths of forearm, thigh, and calf." Thus for an abbreviated program, McCloy would select upper arm circumference instead of calf circumference, and would retain elbow or knee width, but otherwise his selection of measurements corresponds with ours except in respect to the evaluation of the amount of subcutaneous fat. For this purpose McCloy recommends the use of the subcutaneous spring caliper, advocated by Franzen, measuring fat on the front and back of the chest and on the abdominal wall, whereas we have relied upon a subjective evaluation of this attribute in two locations, recorded on the basis of a five point scale. McCloy obviously had much the same objectives in mind in selecting his measurements, and his list is probably more appropriate than the one here given, if individuals properly trained in anthropometry and with sufficient time available can be present in the school. McCloy's interpretation of the measurements obtained calls for their "correction" for amount of fat by use of given tables and for obtaining several indices in the same manner. Thus McCloy's method involves somewhat more preparation and use of more tables than does the present one, but the additional effort may be justified for those having sufficient time and interest. For the details of his method of interpretation the reader is referred to the original publications.

Franzen,[9] Dearborn and Rothney,[18] and Massler,[19] as well as many others, have advocated still other measurements or different methods of evaluating them, but no purpose would be served by reviewing them here since they are not in common use and are not here being recommended.

In Part II of this article, the procedures to be followed in taking the recommended measurements, the method advocated for interpreting them, and the tables of norms and charts to be used in so doing will be presented.

* A few other measurements are listed as optional for use in checking abnormal cases. Breathing capacity, strength index, and stage of pubescence are called for, but these are not here considered part of the anthropometric examination.

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Part II. Methods To Be Followed in Taking and Interpreting Measurements and Norms To Be Used

Procedures to be Followed in Taking Measurements

PART I of this article dealt with the problems involved in the use of body measurements in connection with the School Health Program and discussed the selection of measurements. The measurements recommended as a minimum for routine use in schools were weight, height, hip width (pelvic breadth at crests of ilia), chest circumference and leg girth (greatest circumference of calf). It was further recommended that subjective evaluations of the thickness of folds of skin and subcutaneous tissue be made by the clinician at two locations. It has been found that the five measurements can be taken and checked according to the plan recommended in the directions, and can be recorded and rated in relation to the recommended norms, in an average of eight minutes per child. With this done by the school nurse or another carefully trained assistant the physician can have in his hands at the beginning of the medical examination quantitative information, the possible significance of which he can grasp at a glance and which with a little practice he will find of substantial help in interpreting his clinical findings.

It need hardly be said that the errors inherent in measuring children must be kept as small as possible if the results are to serve any useful purpose. Measurements must not only be taken in the same way at all examinations, but the same techniques must be followed as were used in establishing the norms to which they are referred. It follows, then, that the procedures described below represent those used in constructing the norms which we shall recommend as "frames of reference."

Since the measurements taken are to be referred to norms which give half year age values, as described below, it contributes to ease and accuracy of interpretation if appointments for children to be measured can be made near to their half year birthdays. For example, measurements taken when a child is 6 years, 2½ months of age must be compared with values for children who were approximately 6 years old when measured. A child 6 years, 3½ months of age must be compared with

standards for 6 years, 6 months. While these differences are relatively small, they may be eliminated by arranging for children to come in for measurements on a convenient date nearer to a half year age.

It is important that measurements be taken under working conditions which are as satisfactory as possible. Wherever the physical resources of the school will permit, a special room should be used. The room should be brought to a temperature of 75° F. to 80° F. and should be well lighted to assure that the small figures of the measuring instruments are clearly seen and correctly read. All measurements should be taken with the subject wearing nothing more than light socks and shorts or, in the case of older girls, light socks, shorts, and brassiere. Girls and boys should be measured at different times.

Body Weight—Use beam-type, platform scales. At the beginning of each examination period check the scales and, in the event they are out of balance, adjust them. Request the subject to stand in the center of the platform of the scales. As the record for weight is obtained, make sure that the subject's hands are not in contact with the head portion of the scales, with the wall, or with any other object.

Standing Height—Use a millimeter scale, two meters in length, fixed in the upright position and a wooden headpiece having two faces at right angles. The millimeter scale may be a wooden or metal anthropometer mounted against the wall, or a millimeter paper scale pasted either on a special board or (if the wall has a smooth surface and no projecting wainscoting) directly on the wall. The latter should be checked occasionally for accuracy. Orient the subject as follows: heels, buttocks, upper part of back, and rear of head in contact with the millimeter scale; heels nearly together but not touching each other; arms hanging at the sides in a natural manner; head adjusted so that the tragus, or cartilagenous projection before the external orifice of the ear, and the lower border of the bony orbit lie in a plane parallel with the floor. When the subject is in position, place one face of the headpiece against the scale and bring the other face down, keeping it horizontal, until it crushes the subject's hair and makes firm contact with the top of his head. See that the heels are kept in firm contact with the floor, that the trunk is maintained in "non-slumped" contact with the scale, and that no obstruction prevents a firm contact with the head (e.g., combs, clasps, ribbons, or braids).

Hip Width (pelvic breadth at crests of ilia)—Use broad-branched, sliding calipers. Measure hip width as the distance from the lateral-most point of the crest of the ilium on one side to the corresponding point on the other side. With the subject in the erect position facing the measurer, place the inside face of each branch of the calipers squarely in contact with one of the landmarks. Apply the maximum pressure that can be exerted without pain to the subject. If the subject appears to turn his hips as the pressure is applied, check the measurement.

Chest Circumference—Use a millimeter steel or linen tape. In the latter case check this tape frequently against a meter stick and discard if it has stretched or shrunk appreciably. Have the subject stand in a natural manner and look straight ahead; move the subject's arms slightly away from the sides of the body and request that they be so held in order to permit passing the tape around the thorax. Stand (or sit) in front of the subject and measure the girth of the thorax at the level of the xiphoid process or lowest segment of the sternum (e.g., the notch just under the body of the sternum and between the attachments of the last ribs), and in a plane at right angles to the

vertebral column. Usually the tape will be almost in the horizontal plane and posteriorly it will lie below the inferior angles of the scapulae. Apply only sufficient tension to enable the tape to rest against the perimeter of the thorax without slipping. Record the median value obtained during normal respiration. Conversing with the child overcomes attempts at "holding the breath." It is particularly necessary to note that the position of the head is maintained, since the child's interest in the procedure often prompts him to look down at the tape.

Leg Girth (Maximum circumference of calf)—Use the same instrument as for chest circumference. Have the subject stand with his feet several inches apart and with his weight equally distributed through both lower limbs. Pass the tape around the left leg and measure the maximum girth of the calf at right angles to its long axis. It is necessary to try several different levels in the calf region in order to locate the largest measurement. Care must be taken to see that the tape is kept at right angles to the long axis of the leg and that its contact is at once definite but "slight" (i.e., not sufficient to indent the skin).

Whenever time will allow, take two separate measurements of height, hip width, and the circumferences of chest and leg. This procedure will be found highly profitable for it occasionally eliminates large errors, adds to the precision of the records, and keeps the measurer directly informed regarding the reliability of his (or her) measurements.

Thickness of Skin and Subcutaneous Tissue (fat)—Estimate this in two areas: (a) in the region slightly below and a little lateral to the inferior angle of the left scapula, and (b) in the region immediately above the crest of the left ilium. For each area, use the method of first placing the thumb and index finger of one hand in an opposable relationship at a distance of about 30 millimeters (experience with the method will reveal the desirability of adapting this distance to the firmness and amount of subcutaneous tissue of the individual subject), and of then drawing the two digits together and elevating between them a double layer of skin and subcutaneous tissue. The object in this is to secure between one's thumb and index finger a *complete double layer* of skin and subcutaneous tissue without including any of the underlying muscle tissue. After a satisfactory fold has been obtained, it should be held with moderate firmness and its thickness rated on a five-category scale. The rating presupposes a background of information and experience. It presupposes the knowledge that in these two areas the thickness of the skin and subcutaneous tissue tends to increase with age during the school years and to be greater at any given age in females than in males.* It further assumes considerable clinical experience in making judgments of subcutaneous tissue in these areas—experience affording a working familiarity with the range of individual differences found in given age-sex groups.

Employ the symbols +, ++, +++, ++++ and +++++. Let + represent the lower end of the scale, +++ an average amount of tissue, and +++++ the upper end of the scale. Thus for the supra-iliac region in females: at 6 years of age, ratings of +, +++, and +++++ will correspond to tissue folds with thicknesses of approximately "6 to 7 mm.," "10 to 12 mm.," and "17 mm. or

* To illustrate: In the typical white female, the thickness of the skin and subcutaneous tissue increases over the period 6 to 18 years from 8 to 15 mm. on the back of the thorax and from 11 to 20 mm. above the ilium. The values for the typical white male are only slightly lower at 6 years but show smaller increase over the elementary and high school years; for each area the increase in thickness is roughly 85 per cent on females and 50 per cent on males.

more," respectively; at 18 years of age the same symbols will indicate folds approximating "9 to 12 mm.," "17 to 23 mm.," and "30 mm. or more," respectively. Similarly for the designated region on the back of the thorax in males: at 6 years of age ratings of +, +++, and +++++ will correspond to tissue folds having thicknesses of about "4 to 5 mm.," "7 to 8 mm.," and "12 mm. or more," respectively; at 18 years of age the same symbols will indicate folds of roughly "6 to 7 mm.," "10 to 13 mm.," and "20 mm. or more," respectively. Ratings will be facilitated by scheduling the children of each sex in order of age or grade.

THE INTERPRETATION OF MEASUREMENT RESULTS

A recorded measurement only has value for the school physician to the extent that he is able to interpret it meaningfully. Some meaning may be derived by relating it to a standard figure representing the average, but much more is obtained when it is related to figures depicting the distribution for the measurement. This tells not only whether the measurement is above or below the average, but also how unusual it is, e.g., whether the child is larger or smaller in this respect than 60 per cent of his group, 75 per cent of his group, or 90 per cent of his group. Additional value attaches to a measurement if its position in the distribution is compared with the rankings of the individual in other attributes. For example, when considering the significance of a low position in the weight distribution it is important to know what positions the child holds in the distributions for height, chest circumference, and hip width. These considerations have to do with helping to understand what the child is like *at the moment*. Still more value can be secured from a child's measurements at the moment if they can be compared with those taken at earlier ages, thus obtaining evidence as to the relative rates of progress. A rise in the position held by a measurement within the range at one age over a previous age indicates that growth has been more rapid than usual in this dimension during the intervening time, and a fall in its position indicates that it has been less rapid. Thus, following the positions held by each measurement from period to period is an effective means of recognizing whether or not a child has been growing in a satisfactory manner. This is a more appropriate method of comparing a child's growth with his own expectancy than is comparing the actual gain with tables of average gains.

Perhaps a specific illustration will reënforce and epitomize the values of measurements that have been enumerated. A boy age 6 years is found to weigh 43 lbs. This means little unless one knows that about 80 per cent of boys age 6 years weigh more than 43 lbs. It means more if one knows that this boy is not short and not of slender build, being up to the average for boys of 6 years in height, chest circumference, and hip width. It means still more if one knows that he weighed 41 lbs. at 5 years, which was nearly up to average, about 60 per cent weighing more than 41 lbs. at that age. Clearly this failure to gain normally is revealed and its extent recognized by bringing into juxtaposition the rankings of this boy at the two ages. School health personnel will not fail to appreciate the breadth of helpful information which accrues from such interpretations of status and progress.

Many schemes have been devised to aid in the problem of measurement interpretation and of rendering the conclusions arrived at as valid as possible. Some of these have been referred to in Part I of this paper. Unwarranted interpretations due to the faulty choice or use of norms can easily render a

program of measurement of no avail, and at times may lead to the recommendation of procedures which are positively harmful. As has been indicated, we consider it desirable that attention be focused upon the position of each measurement in the distribution of measurements, rather than upon the relation of each measurement to the average alone. This tends to counteract the erroneous inference that the average is the standard all should attain, or that a certain percentage deviation from the average separates the normal and satisfactory from the abnormal or unsatisfactory. For practical purposes it is helpful if one can determine the ranking of a measurement by direct reference to tables or charts, without resort to mathematical calculations. Being able to convert measurements rapidly into positional ranks serves to direct attention from their numerical values to their implications for health appraisal. It is also our view that the method most practical should not only minimize mathematical procedures, but should provide for separate consideration as well as ready intercomparison of the rankings in different measurements. That is, it should be possible (a) to take cognizance of the change in each individual measurement—in weight or height, for instance, not merely weight in terms of height, and (b) to study—in comparable terms—the changes in one measurement with those in another or in several others.

The two methods in common use for characterizing distributions of measurements are the standard deviation and percentiles. Although a series of selected percentiles (e.g., the 10th, 25th, 50th, 75th and 90th) does not allow as accurate placement of individuals as does the standard deviation, the greater refinement possible through the latter is not necessary for school health purposes. For example, it would be more precise to say that a child's height was 0.9 standard deviations below the mean than to say that it fell between the 10th and 25th percentiles or just below the 20th percentile. However, either of the latter expressions is sufficient for practical purposes and is more readily understood by most physicians than are statements in terms of the standard deviation.

By use of percentile tables or charts the physician can readily determine in what portion of the distribution a child falls with respect to each measurement taken. He may then compare the positions held for the different measurements at the time and note whether the same positions are maintained from one examination to another. This method allows considerable latitude as to what measurements are taken and requires that the physician think for himself regarding the implications of the relationships found between measurements.

A form sheet for each child is presented in Figure 1 to suggest how measurements "M" and percentile ranks "P" may conveniently be recorded whenever taken and carried in the school health files. Following down the percentile rank column for any given measurement the physician can note at a glance if a marked change has occurred. Following across the line for a particular age he can rapidly envisage the relationships between measurements. While it is not necessary in every instance to plot these values on graphs in order to interpret them adequately, it is recommended that with children measured periodically their successive records be displayed in graphic form. Hence Figures 2 and 3 constitute charts on which may be plotted the records for an individual boy or girl at all school ages. These may be printed on a separate sheet or (somewhat more economically, but less conveniently) on the back of the sheet reproducing Figure 1.

The question arises, How representa-

TABLE 1

Selected Percentiles for Five Body Measurements: Ages 5 to 9 Years

(The basic data were collected 1930–1945 on Iowa City children of northwest European ancestry attending University of Iowa experimental schools.)

Boys						Girls				
Percentiles						Percentiles				
10	25	50	75	90		10	25	50	75	90
					5 Years					
36.6	39.6	42.8	46.5	49.7	Weight	36.1	38.6	41.4	44.2	48.2
105.3	108.3	111.3	114.2	116.7	Height	105.0	107.2	109.7	112.9	115.4
17.0	17.6	18.3	18.9	19.6	Hip Width	17.0	17.4	18.0	18.7	19.4
51.6	52.8	54.5	56.2	57.5	Chest Circ.	50.2	51.4	52.9	54.6	56.5
21.0	21.7	22.6	23.6	24.6	Leg Girth	21.1	21.8	22.8	23.8	24.7
					5½ Years					
38.8	42.0	45.6	49.3	53.1	Weight	38.0	40.8	44.0	47.2	51.2
108.3	111.2	114.4	117.5	120.1	Height	107.8	110.2	112.8	116.1	118.9
17.4	18.0	18.7	19.4	20.1	Hip Width	17.4	17.8	18.4	19.1	20.0
52.4	53.6	55.3	57.1	58.5	Chest Circ.	50.9	52.2	53.7	55.5	57.4
21.4	22.2	23.1	24.1	25.2	Leg Girth	21.5	22.3	23.3	24.3	25.3
					6 Years					
40.9	44.4	48.3	52.1	56.4	Weight	39.9	42.9	46.5	50.2	54.2
111.2	114.1	117.5	120.8	123.5	Height	110.6	113.2	115.9	119.3	122.3
17.7	18.4	19.1	19.8	20.5	Hip Width	17.7	18.2	18.8	19.5	20.5
53.2	54.4	56.1	57.9	59.5	Chest Circ.	51.5	52.9	54.5	56.3	58.2
21.8	22.6	23.6	24.6	25.7	Leg Girth	21.9	22.7	23.8	24.8	25.8
					6½ Years					
43.4	47.1	51.2	55.4	60.4	Weight	42.2	45.5	49.4	53.3	57.7
114.1	117.2	120.8	124.2	127.0	Height	113.7	116.2	119.1	122.6	125.6
18.1	18.8	19.5	20.2	21.0	Hip Width	18.1	18.6	19.2	20.0	21.1
54.1	55.3	57.0	58.9	60.6	Chest Circ.	52.2	53.7	55.3	57.2	59.2
22.2	23.1	24.1	25.2	26.3	Leg Girth	22.3	23.2	24.3	25.4	26.4
					7 Years					
45.8	49.7	54.1	58.7	64.4	Weight	44.5	48.1	52.2	56.3	61.2
116.9	120.3	124.1	127.6	130.5	Height	116.8	119.2	122.3	125.9	128.9
18.5	19.2	19.9	20.6	21.4	Hip Width	18.4	18.9	19.6	20.4	21.6
54.9	56.1	57.8	59.8	61.6	Chest Circ.	52.8	54.4	56.1	58.0	60.1
22.6	23.5	24.6	25.7	26.9	Leg Girth	22.7	23.7	24.8	25.9	27.0
					7½ Years					
48.5	52.6	57.1	62.1	68.7	Weight	46.6	50.6	55.2	59.8	65.6
120.0	123.5	127.1	130.9	133.9	Height	119.5	122.0	125.2	128.8	131.8
18.9	19.6	20.3	21.0	21.9	Hip Width	18.8	19.3	20.1	20.9	22.1
55.8	57.1	58.8	61.0	62.9	Chest Circ.	53.5	55.1	57.0	59.0	61.2
23.1	24.1	25.2	26.3	27.6	Leg Girth	23.1	24.2	25.3	26.4	27.7
					8 Years					
51.2	55.5	60.1	65.5	73.0	Weight	48.6	53.1	58.1	63.3	69.9
123.1	126.6	130.0	134.2	137.3	Height	122.1	124.8	128.0	131.6	134.6
19.2	19.9	20.7	21.4	22.3	Hip Width	19.1	19.7	20.5	21.3	22.6
56.7	58.0	59.8	62.1	64.1	Chest Circ.	54.2	55.8	57.8	59.9	62.3
23.6	24.6	25.7	26.8	28.2	Leg Girth	23.5	24.6	25.8	26.9	28.3
					8½ Years					
53.8	58.3	63.1	68.9	77.0	Weight	50.6	55.5	61.0	66.9	74.5
125.7	129.1	132.8	137.0	140.0	Height	124.6	127.3	130.5	134.4	137.5
19.6	20.3	21.1	21.8	22.7	Hip Width	19.4	20.1	20.9	21.8	23.1
57.6	59.0	60.8	63.3	65.4	Chest Circ.	54.9	56.5	58.7	60.9	63.5
24.1	25.1	26.3	27.4	28.9	Leg Girth	23.9	25.0	26.3	27.5	28.9
					9 Years					
56.3	61.1	66.0	72.3	81.0	Weight	52.6	57.9	63.8	70.5	79.1
128.3	131.6	135.5	139.8	142.6	Height	127.0	129.7	132.9	137.1	140.4
19.9	20.6	21.4	22.2	23.0	Hip Width	19.7	20.5	21.3	22.2	23.5
58.4	59.9	61.8	64.4	66.7	Chest Circ.	55.5	57.2	59.6	61.9	64.7
24.5	25.6	26.8	28.0	29.5	Leg Girth	24.2	25.4	26.8	28.1	29.5

TABLE 1 (Cont.)

Selected Percentiles for Five Body Measurements: Ages 9½ to 13½ Years

Boys						Girls				
Percentiles						Percentiles				
10	25	50	75	90		10	25	50	75	90
					9½ Years					
58.7	63.7	69.0	76.0	85.5	Weight	54.9	60.4	67.1	74.8	84.4
130.6	134.0	137.9	142.1	145.1	Height	129.4	132.2	135.8	139.9	143.2
20.2	21.0	21.7	22.6	23.5	Hip Width	20.1	20.9	21.8	22.8	24.1
59.3	60.9	62.9	65.5	68.1	Chest Circ.	56.2	58.0	60.5	63.2	66.1
24.9	26.0	27.3	28.5	30.1	Leg Girth	24.7	25.9	27.3	28.6	30.2
					10 Years					
61.1	66.3	71.9	79.6	89.9	Weight	57.1	62.8	70.3	79.1	89.7
132.8	136.3	140.3	144.4	147.5	Height	131.7	134.6	138.6	142.6	146.0
20.4	21.3	22.0	22.9	23.9	Hip Width	20.5	21.2	22.2	23.3	24.6
60.1	61.8	63.9	66.6	69.4	Chest Circ.	56.9	58.7	61.4	64.4	67.4
25.3	26.4	27.7	29.0	30.7	Leg Girth	25.1	26.3	27.7	29.1	30.9
					10½ Years					
63.7	69.0	74.8	83.4	94.6	Weight	59.9	66.4	74.6	84.1	95.1
135.1	138.4	142.3	146.8	149.7	Height	134.4	137.5	141.7	145.9	149.7
20.8	21.6	22.3	23.2	24.4	Hip Width	21.0	21.7	22.9	24.0	25.3
60.9	62.8	64.9	67.7	70.7	Chest Circ.	57.8	59.9	62.8	65.8	69.0
25.7	26.8	28.1	29.5	31.4	Leg Girth	25.6	26.8	28.3	29.9	31.8
					11 Years					
66.3	71.6	77.6	87.2	99.3	Weight	62.6	69.9	78.8	89.1	100.4
137.3	140.5	144.2	149.2	151.8	Height	137.0	140.3	144.7	149.2	153.4
21.1	21.8	22.6	23.5	24.8	Hip Width	21.4	22.2	23.5	24.6	26.0
61.7	63.7	65.9	68.8	71.9	Chest Circ.	58.6	61.1	64.2	67.2	70.5
26.0	27.1	28.5	30.0	32.0	Leg Girth	26.0	27.3	28.9	30.6	32.6
					11½ Years					
69.2	74.6	81.0	91.6	104.5	Weight	66.1	74.0	83.2	94.0	106.0
139.8	142.9	146.9	151.4	154.8	Height	139.8	143.1	148.1	152.9	157.0
21.5	22.2	23.1	24.0	25.3	Hip Width	21.9	22.8	24.2	25.4	26.8
62.5	64.6	66.9	69.9	73.1	Chest Circ.	59.6	62.5	65.5	68.5	72.2
26.4	27.6	29.0	30.6	32.8	Leg Girth	26.6	27.9	29.5	31.2	33.2
					12 Years					
72.0	77.5	84.4	96.0	109.6	Weight	69.5	78.0	87.6	98.8	111.5
142.4	145.2	149.6	153.5	157.9	Height	142.6	145.9	151.5	156.6	160.6
21.9	22.6	23.5	24.5	25.8	Hip Width	22.4	23.4	24.9	26.2	27.6
63.3	65.5	67.8	70.9	74.2	Chest Circ.	60.6	63.8	66.7	69.7	73.8
26.8	28.0	29.5	31.2	33.5	Leg Girth	27.1	28.5	30.1	31.8	33.8
					12½ Years					
74.6	80.6	88.7	102.0	116.4	Weight	74.7	83.7	93.4	104.9	118.0
144.5	147.5	152.3	157.2	161.6	Height	145.9	149.3	154.3	159.1	162.7
22.3	23.1	24.1	25.1	26.5	Hip Width	23.0	24.0	25.5	26.8	28.3
64.2	66.5	69.1	72.4	75.8	Chest Circ.	61.8	64.9	67.7	70.9	75.3
27.3	28.6	30.1	32.0	34.2	Leg Girth	27.7	29.1	30.7	32.4	34.3
					13 Years					
77.1	83.7	93.0	107.9	123.2	Weight	79.9	89.4	99.1	111.0	124.5
146.6	149.7	155.0	160.8	165.3	Height	149.1	152.6	157.1	161.5	164.8
22.7	23.6	24.6	25.6	27.2	Hip Width	23.6	24.6	26.0	27.4	29.0
65.0	67.4	70.3	73.8	77.4	Chest Circ.	62.9	65.9	68.6	72.0	76.7
27.8	29.2	30.8	32.7	34.8	Leg Girth	28.2	29.7	31.2	32.9	34.8
					13½ Years					
82.2	89.6	100.3	115.5	130.1	Weight	85.5	94.6	103.7	115.4	128.9
149.4	153.1	158.9	164.6	168.9	Height	151.1	154.4	158.4	162.6	165.9
23.2	24.1	25.2	26.4	27.8	Hip Width	24.2	25.2	26.5	27.8	29.5
66.3	68.8	72.4	75.8	79.4	Chest Circ.	63.8	66.6	69.3	72.9	77.7
28.5	29.9	31.6	33.4	35.3	Leg Girth	28.7	30.2	31.6	33.4	35.1

(*Cont.*)

TABLE 1 (Cont.)

Selected Percentiles for Five Body Measurements: Ages 14 to 18 Years

Boys						Girls				
Percentiles						Percentiles				
10	25	50	75	90		10	25	50	75	90
					14 Years					
87.2	95.5	107.6	123.1	136.9	Weight	91.0	99.8	108.4	119.7	133.3
152.1	156.5	162.7	168.4	172.4	Height	153.0	156.1	159.6	163.7	167.0
23.6	24.6	25.8	27.1	28.3	Hip Width	24.8	25.8	26.9	28.1	29.9
67.6	70.2	74.5	77.8	81.4	Chest Circ.	64.6	67.2	69.9	73.7	78.6
29.1	30.6	32.3	34.1	35.8	Leg Girth	29.2	30.6	32.0	33.8	35.4
					14½ Years					
93.3	101.9	113.9	129.1	142.4	Weight	94.2	102.5	111.0	121.8	135.7
155.0	159.4	165.3	170.7	174.6	Height	154.1	156.9	160.4	164.3	167.6
24.1	25.1	26.3	27.5	28.7	Hip Width	25.2	26.2	27.2	28.4	30.3
69.4	72.3	76.3	79.6	83.1	Chest Circ.	65.1	67.7	70.4	74.2	79.2
29.8	31.3	32.9	34.6	36.2	Leg Girth	29.6	30.9	32.3	34.1	35.7
					15 Years					
99.4	108.2	120.1	135.0	147.8	Weight	97.4	105.1	113.5	123.9	138.1
157.8	162.3	167.8	173.0	176.7	Height	155.2	157.7	161.1	164.9	168.1
24.6	25.6	26.7	27.9	29.1	Hip Width	25.6	26.5	27.5	28.7	30.6
71.1	74.4	78.0	81.3	84.8	Chest Circ.	65.5	68.1	70.9	74.7	79.8
30.4	31.9	33.4	35.1	36.6	Leg Girth	29.9	31.1	32.6	34.3	35.9
					15½ Years					
105.2	113.5	124.9	139.7	152.6	Weight	99.2	106.8	115.3	125.6	139.6
160.3	164.7	169.7	174.8	178.2	Height	155.7	158.2	161.7	165.3	168.6
25.1	26.0	27.1	28.2	29.4	Hip Width	25.9	26.7	27.8	29.0	30.8
72.8	75.8	79.4	82.9	86.3	Chest Circ.	65.8	68.4	71.3	75.1	80.2
30.9	32.3	33.8	35.5	37.0	Leg Girth	30.1	31.4	32.9	34.5	36.1
					16 Years					
111.0	118.7	129.7	144.4	157.3	Weight	100.9	108.4	117.0	127.2	141.1
162.8	167.1	171.6	176.6	179.7	Height	156.1	158.6	162.2	165.7	169.0
25.6	26.4	27.4	28.4	29.6	Hip Width	26.1	26.9	28.0	29.2	31.0
74.4	77.2	80.7	84.5	87.8	Chest Circ.	66.1	68.7	71.6	75.4	80.5
31.3	32.7	34.2	35.8	37.3	Leg Girth	30.3	31.6	33.1	34.6	36.3
					16½ Years					
114.3	121.6	133.0	147.9	161.0	Weight	101.9	109.4	118.1	128.4	142.2
164.2	168.4	172.7	177.4	180.7	Height	156.2	158.8	162.4	165.9	169.2
25.9	26.7	27.6	28.6	29.8	Hip Width	26.2	27.0	28.2	29.3	31.1
75.4	78.1	81.6	85.4	88.8	Chest Circ.	66.3	69.0	71.9	75.7	80.7
31.5	32.9	34.4	36.1	37.6	Leg Girth	30.5	31.8	33.3	34.8	36.5
					17 Years					
117.5	124.5	136.2	151.4	164.6	Weight	102.8	110.4	119.1	129.6	143.3
165.5	169.7	173.7	178.1	181.6	Height	156.3	159.0	162.5	166.1	169.4
26.1	26.9	27.8	28.7	29.9	Hip Width	26.3	27.1	28.3	29.4	31.2
76.4	78.9	82.5	86.2	89.7	Chest Circ.	66.4	69.2	72.1	75.9	80.9
31.7	33.1	34.6	36.3	37.8	Leg Girth	30.6	31.9	33.4	34.9	36.6
					17½ Years					
118.8	125.8	137.6	153.6	166.8	Weight	103.2	110.8	119.5	130.2	143.9
165.9	170.1	174.1	178.5	182.0	Height	156.3	159.0	162.5	166.1	169.4
26.3	27.0	27.9	28.8	30.0	Hip Width	26.4	27.2	28.4	29.5	31.3
77.0	79.4	83.0	86.7	90.2	Chest Circ.	66.5	69.3	72.2	76.0	81.0
31.8	33.3	34.8	36.5	38.0	Leg Girth	30.7	32.0	33.5	35.0	36.7
					18 Years					
120.0	127.1	139.0	155.7	169.0	Weight	103.5	111.2	119.9	130.8	144.5
166.3	170.5	174.5	178.9	182.4	Height	156.3	159.0	162.5	166.1	169.4
26.5	27.1	28.0	28.9	30.1	Hip Width	26.4	27.2	28.4	29.5	31.3
77.5	79.8	83.4	87.1	90.7	Chest Circ.	66.6	69.4	72.3	76.1	81.1
31.9	33.4	34.9	36.6	38.1	Leg Girth	30.8	32.1	33.6	35.1	36.8

tive are our recommended norms for healthy children in different localities? The character of the group used in deriving the norms which are given in the tables and used in constructing the charts is described below, but it should not be inferred that these figures symbolize the "ideal" or "optimum" child population. Clearly, in many schools of the country it would be desirable to use norms more representative of the children in attendance from the standpoint of racial composition. Also there are those who would favor the use of norms based upon as healthy and well developed a group as can be secured—norms that could serve as "the goal of excellence to be achieved." It is not essential, however, that the norms used represent either an "ideal" population or one strictly "identical" with that to which they are applied; what is essential is that one know the characteristics of the group used in obtaining them and understand their construction sufficiently to utilize them in an intelligent manner. In studying any school population it is desirable after a moderately large number of measurements have been amassed to distribute them and discover whether or not they yield percentiles systematically higher or lower than those being used as norms.

The norms presented in the accompanying tables are offered as an initial set of working standards which allow immediate application of the method recommended. If this method is found to be acceptable to school physicians, it is proposed that similar norms be

NAME BIRTH DATE

AGE	WEIGHT		HEIGHT		HIP WIDTH		CHEST CIRC.		LEG GIRTH		THICKNESS SKIN & FAT	
YRS-MOS.	M	P	M	P	M	P	M	P	M	P	CHEST	ILIAC

AGE—Give to nearest month, checking with birth date.
M = Measurement as taken.
P = Percentile rank in normal distribution from appropriate age and sex table.
Skin & Fat = Clinical ratings on five plus scale. See directions for use.

FIGURE 1—Form suggested for use in the individual health records of school children. This allows for recording the measurements taken and their respective percentile positions at each of twenty ages. Reading the percentiles across a single age line reveals at a glance the interrelationships between all the measurements taken and the effect upon them of subcutaneous fat. Reading down each percentile column shows how the child's position within the range has changed with age in respect to each measurement. This form should follow the child to all schools attended throughout his school life.

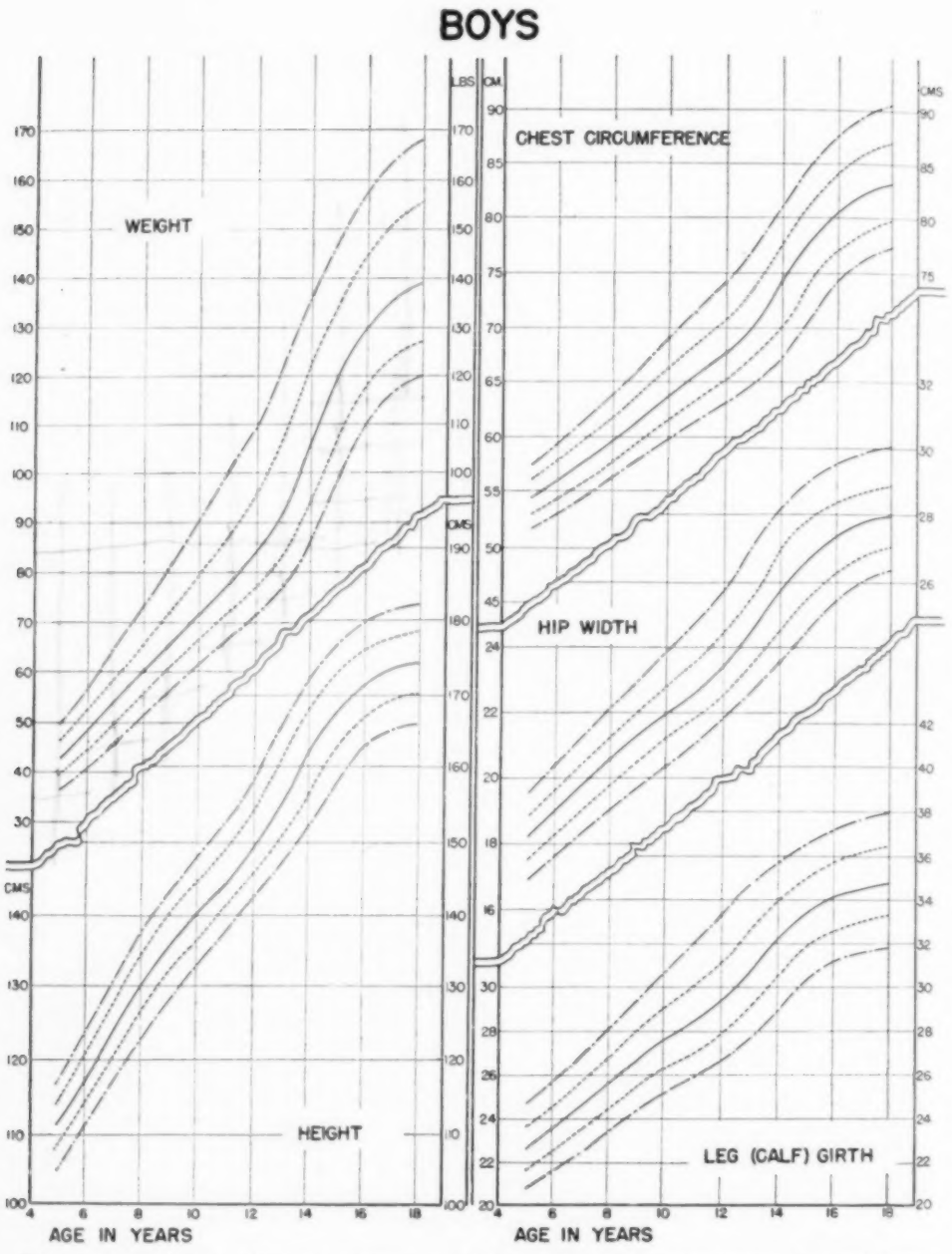

FIGURE 2—Graphs for plotting measurements of boys. For each measurement the trend lines shown—proceeding from the highest to the lowest—represent the 90th, 75th, 50th, 25th and 10th percentiles.

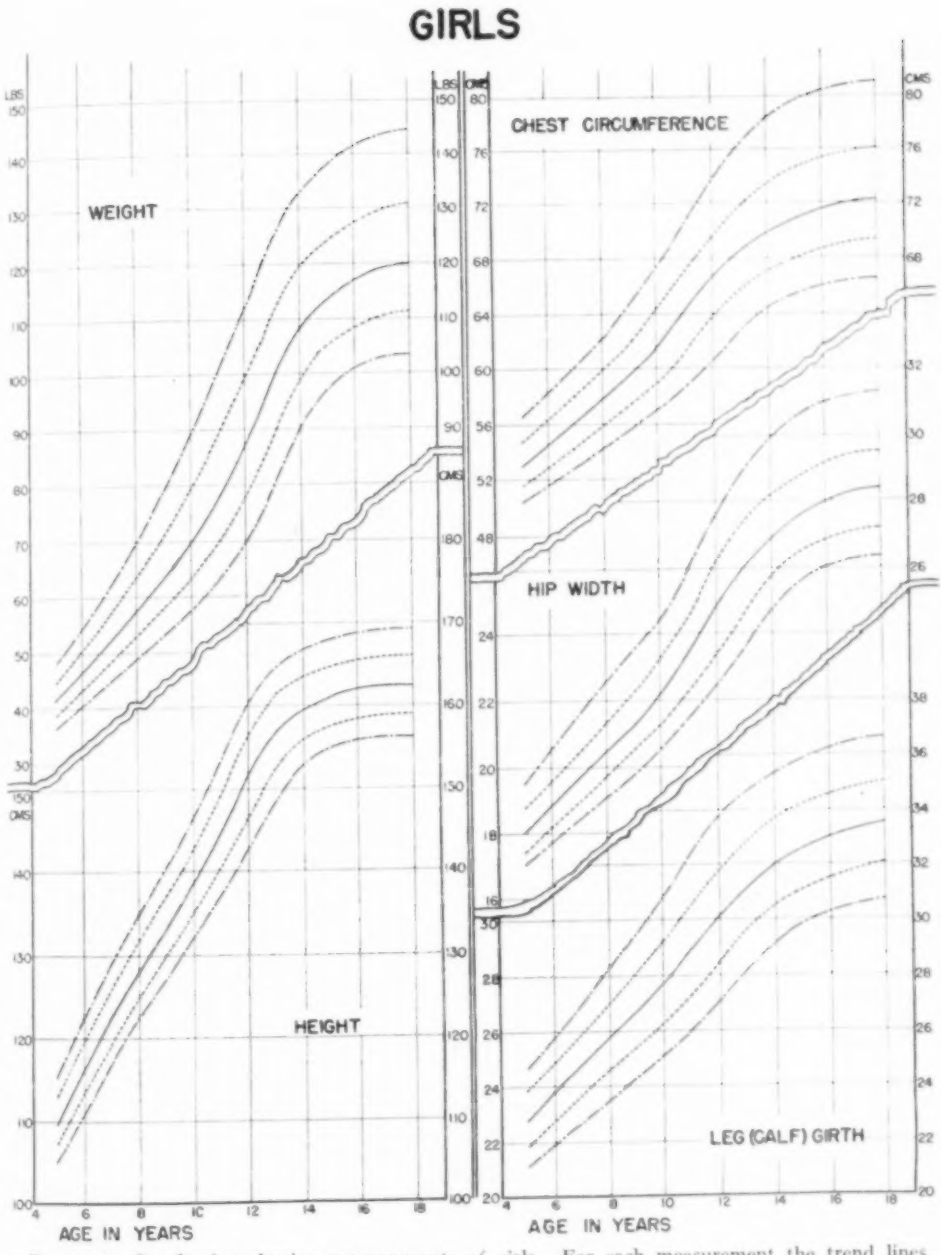

FIGURE 3—Graphs for plotting measurements of girls. For each measurement the trend lines shown—proceeding from the highest to the lowest—represent the 90th, 75th, 50th, 25th and 10th percentiles.

constructed representing other racial groups (e.g., Negroid, Mongoloid, American Indian, Mexican).

NORMS TO BE USED IN MAKING INTERPRETATIONS

The norms recommended for present use were derived from measurements of white children living in or near Iowa City, Iowa. The children were all in attendance at the University of Iowa experimental elementary and high schools during one or more of the years 1930 through 1945.* Their parents were almost exclusively American-born and their grandparents predominantly American-born. Over 90 per cent of the children were of northwest European ancestry, while only a scattering were of southeast European descent. Approximately 40 per cent of the fathers were professional men (mainly members of university faculty); 35 per cent business proprietors, managers, or skilled trade employees; 15 per cent farmers; and the remaining 10 per cent clerks, carriers, or semi-skilled laborers. The only rejections were rare instances of gross physical pathology (e.g., body deformity, marked endocrine dysfunction). Summarizing for racial stock, socio-economic selection and physical condition, the subjects may be described as:

Almost entirely of northwest European descent
Predominantly from the professional and managerial classes
Physically normal (non-pathologic) children

The basic materials employed consisted of 3,771 measurements each for weight, height, chest circumference, hip width, and leg girth. They were obtained from anthropometric examination of several hundred children; most of the children had records extending over 3 to 6 years, a few were available for examination only once, and for a few there were seriatim data covering upward of 9 years.

When the records for each measurement were grouped according to sex and year of age of the child, the following subtotals were obtained:

Age in Years	*Boys*	*Girls*
5	235	210
6	218	169
7	169	130
8	142	115
9	120	110
10	117	112
11	101	113
12	95	112
13	100	120
14	118	134
15	144	169
16	137	151
17	117	140
18	86	87

Two comments are pertinent regarding this tabulation. First, the numbers for each age represent the numbers of different children measured at that age (i.e., at age 5 years measurements were available on 235 boys and 210 girls). Secondly, the children were usually measured within 2 weeks of the age indicated. It follows from this that the norms for 5 years represent children exactly this age, and, consequently, a child who gives his age as 5, yet actually is 5 years, 4 months, or 5 years, 5 months, should be referred not to the 5 year norms but to the 5½ year norms.*

After division into age-sex subgroups, the records for each measurement were tabulated in a frequency distribution (arranged in approximate rank order) and five selected percentiles (10th, 25th,

* The inappropriateness of evaluating present-day children with norms based upon data collected earlier than the 1930's has been clearly shown. See reports by Meredith in *Am. J. Dis. Child.* 62:909, 1941; *Human Biol.*, 16:126, 1944; and *Am. J. Phys. Anthrop.*, 28:1, 1941.

* The full year values given in the tables represent actual measurements, usually within 2 weeks of the birthday. The half year values represent measurements derived by interpolation. Sufficient accuracy is attained by relating a child to the nearest half year norms in the table without further interpolation.

50th, 75th, and 90th) obtained. Table 1 presents the percentiles for each measurement arranged according to age and sex. It will be seen, for instance, that the typical values (50th percentiles) secured on the 235 5 year old boys are approximately 43 lbs. for weight, 111 cm. for height, 18 cm. for hip width, 54 cm. for chest circumference, and 23 cm. for leg girth.

ILLUSTRATIVE EXAMPLES OF THE USE OF THE NORMS AND THE INTERPRETATION OF MEASUREMENTS

In order to illustrate the use of Table 1 in conjunction with Figure 1, assume that a school nurse has just measured two 5 year old girls (i.e., preferably at or near their 5th birthdays but not less than 4 years, 9 months, and not yet 5 years, 3 months). She records her results on reproductions of Figure 1 in columns "M" under each measurement, in a line giving the child's exact age to the nearest month. She then finds the appropriate percentile figures to record for each in column "P" by reference to the 5 year old norms for girls in Table 1 as follows: If the measurement is near to one of the percentile values, the number of that percentile should be recorded adding the plus or minus sign if required. If the measurement falls more nearly between two percentile values, both should be indicated. Thus, the percentile positions of different measurements may be recorded under "P" as: 10—, 10, 10+, 10–25, 25—, etc. Assume that the records on girl A are 36 lbs. (weight), 105 cm. (height), 17 cm. (hip width), 50 cm. (chest circumference), and 21 cm. (leg girth), while the corresponding measurements on girl B are 45 lbs., 109 cm., 18 cm., 54 cm., and 23 cm. On referring to Table 1, it is found that each of A's measurements has a percentile rank at or very near P 10, and, consequently, 10 is entered on A's sheet in the "P" column to the right of each measurement. B's measurements are a little less readily transformed into percentile ranks. Her weight is 45 lbs., a figure higher than the 75th percentile in Table 1 but much nearer to the 75th than the 90th percentile. It should therefore be recorded as P 75+. In height B falls a little below the 50th percentile from Table 1 and, in accordance with the foregoing recommendations, is assigned a rank of P 50—. In chest circumference B falls more nearly half way between the 50th and 75th percentiles and is therefore recorded as P 50–75. For hip width the correct value is P 50 and for leg circumference P 50+.

Turning to the interpretation of measurements, brief comment on eight illustrative profiles will be ample to suggest to the physician the scope of information that measurements can supply.

Child R, a girl age 7 years, has percentile ranks of 90 plus or minus in all measurements and ratings of +++ for thickness of skin and subcutaneous tissue; she is a large, proportionately well balanced girl—a girl not exceeded in any measurement by more than 10 per cent of the normative group of girls this age.

Child S, a boy aged 7 years, has percentile ranks at or near 10 in all measurements and ratings of +++ for thickness of skin and subcutaneous tissue; he is a small, proportionately well balanced boy—a boy exceeded in each measurement by 90 per cent of the normative group of boys his age.

Child T, a boy 9 years of age, has percentile ranks of 75+ in height, 25 in hip width, and 25–50 in chest circumference, together with ratings for thickness of skin and subcutaneous tissue of +++ on the back of the thorax and ++ above the ilium; he is a moderately tall boy of distinctly slender build.

Child V, a girl 9 years of age, has percentile ranks of 50 for height, 75+ for hip width, and 90 for chest circumference, together with tissue ratings of +++ in both areas; she is a girl of average height and decidedly stocky build.

Child W, an 11 year old girl, has percentile ranks of 75 in height and hip width, 75— in chest circumference, 50–75 in leg girth, and

50— in weight, combined with ratings of + for thickness of skin and subcutaneous tissue; she is a child that should be carefully checked for presence of disease conditions, additional dietary requirements, and needed changes in daily regimen.

Child X, another 11 year old girl, has percentile ranks of 95 for weight and leg girth, 75+ for chest circumference, 75 for hip width, and 50-75 for height, in combination with tissue ratings of +++++; she is a child that should be thoroughly appraised from the standpoints of possible endocrine therapy and nutritional control.

Children Y and Z are 15 year old boys. When 10 years of age both had percentile ranks approximating 50 in all measurements. Comparison of their records over the succeeding 5 years shows a gradual divergence in ranks. Now (at 15 years) Y's percentile ranks approximate 75 throughout and Z's ranks are all between 10 and 25. These patterns of change indicate that the so-called adolescent acceleration occurred at a fairly early age in the case of Y while, in the case of Z, it has not yet manifested itself.

CONCLUSIONS

It is desirable that school health services take a few body measurements on all children once or twice yearly and that they adopt a simple uniform method of interpreting them. This should take into account the position held by each child in each measurement at each examination in relation to the customary ranges of variability for like sex and age. In the school situation it does not seem necessary that mathematical equations or indices be worked out or that many measurements be considered. It is important that all measurements be taken carefully according to the procedures used in establishing the norms. The physician should have these data in hand at the time of examinations and evaluate them in the light of clinical observations.

It is proposed that weight, height, hip width, chest circumference, and leg girth be adopted as basic measurements and taken according to standard techniques as described. It is also suggested that these be recorded as such together with the percentile positions which they represent and that they be plotted on graphs which reveal these percentiles. The necessary tables and graphs are given. The physician should consider the percentile position of each measurement individually and in relation to all the other measurements at each examination, and any changes which may take place from one examination to another. Marked changes should lead to special examinations if they would not otherwise be made routinely. The school physician should acquire the habit of thinking of the significance of these findings in relation to what he can learn about the child from such history as he is able to obtain and such observations as he can make at the time of examination. Among the latter, it is especially important that he give a rating to the amount of skin and subcutaneous tissue and that he take note of muscular development. Measurements serve merely as aids to thoroughgoing evaluation of physical status and growth progress; without careful clinical interpretation they rarely justify clinical diagnoses.

Participation by State and Local Health Departments in Current Medical Care Programs*

JOSEPH W. MOUNTIN, M.D., F.A.P.H.A.
Medical Director, U. S. Public Health Service, Washington, D. C.

MANY persons in public health work are convinced of the artificiality of administrative barriers that persist between preventive medicine and medical care in the United States. As medical science has advanced we have learned that the cure of a communicable disease in one individual may prevent its occurrence in others, and that early treatment of any illness tends to lessen the need for more extensive care later. Today scarcely any aspect of clinical medicine is without its preventive component. On this obvious truth there is little if any intellectual disagreement, but unfortunately it finds far too little expression in action programs.

Attitudes as they exist in the United States serve to perpetuate the figment of separation between prevention and treatment. Health departments continue their original orientation toward a limited notion of prevention; private physicians, dentists, and hospitals regard as their exclusive domain the diagnosis and treatment of profitable illness; and welfare agencies accept, on a relief basis, those who cannot meet the costs of their own care. This arrangement is quite inappropriate to the situation that actually confronts us today.

As the illnesses of childhood and the acute epidemic diseases decline in frequency and severity, the chief health problems of the nation that emerge are those which cannot be attacked effectively by traditional methods of public health agencies. Aside from acute upper respiratory infections, the major disease load of our population today is contributed by heart disease, cancer, nephritis, cerebral vascular accidents, pneumonia, arthritis, diabetes, dental caries, psychoneuroses, defects of vision and hearing, and related conditions. For the most part, they are diseases of adult life, and particularly of the later years, to which age an increasing proportion of our population is surviving. Under the present state of knowledge these diseases can be controlled, or their effects mitigated, only through early diagnosis and adequate care. In great measure, therefore, public health of the future will be comprehensive medical care. Anything that tends to make medical care widely available to all the people should, therefore, have the support of public health agencies, even though their first concern is prevention. In addition medical care has humanitarian and economic values that qualify its provisions as a desirable social enterprise.

It is the opinion of competent authorities that a satisfactory service can be accomplished best through a comprehensive health program of nation-

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wide scope. This is not the place to review the reasoning and experience that lie back of this conclusion. One may simply point out that this conclusion appears to be extending widely throughout the nation, especially among organizations representing the recipients of service. Whatever may be the position of certain professional bodies, it seems altogether likely that sooner or later the nation will have the task of administering a program of universal prepaid personal health services.

Some of the bills now before the Congress place primary administrative responsibility on federal agencies, while others feature operation by state agencies, with the rôle of the federal government limited to allotting financial grants-in-aid. In any event, administrative agents at the state and local levels everywhere are needed and, indeed, are contemplated in bills of either type. It seems clear that state and local departments of health will be called upon to serve in the administration of this public service, because, first, they are in being; second, the purpose of medical care coincides with their basic interest; third, they are long familiar with health conditions and professional relationships in their states; and fourth, a great deal of technical competence is already represented in their staffs.

But we must face the question: Are health departments now prepared to assume this type of new responsibility? I think our state and local health officers, as a group, would be the first to say that at present they are not prepared. And yet opportunities to become prepared are widely available. They are available in an abundant literature in the field of medical economics, health insurance, and related problems covering the experience both in this country and abroad. They are available in courses of instruction at some of the schools of public health, although existing courses require considerable alteration and expansion. But, most important, they are available through day-to-day observation and practical experience with medical care administration in state and local units throughout this nation. If the health officer will free himself from the inhibitions of the past and look around him, he will find numerous operating programs today where he and members of his staff can acquire experience in the administration of medical services. On this occasion I can do little more than enumerate the places where participation by public health personnel would be both profitable to them and beneficial to the services involved.

All states maintain hospitals for mental disorders, and the great majority operate institutions for tuberculosis. Despite the fact that tuberculosis is a communicable disease, fewer than one-half the state health departments have responsibility for operating such facilities. Only in West Virginia have steps been taken to place the mental institutions under public health authorities. By operating the state institutions, health agencies could acquire experience readily usable in general medical administration. Moreover, institutions of the types enumerated should be the centers from which their respective field programs radiate. Not being in control of such institutions, health departments lose the occasion for blending the preventive and curative elements of tuberculosis control and mental hygiene.

The most available opportunity for participation in general medical care administration is through the provision of medical services to the needy. Usually such programs are under the supervision of departments of public welfare, although there is a considerable dispersion of authority, in this field alone, among public and voluntary agencies of different types. The de-

livery of medical services associated with public assistance involves a great variety of tasks, from the approval of budgets covering medical costs to the payment of physicians for rendering direct medical services for welfare clients, or the actual operation of public general hospitals. In the majority of these programs, health departments give little assistance or consultation, and it is a common observation that many programs suffer from the lack of competent professional guidance. In a few places a new orientation is evident. Thus last year Maryland enacted a law transferring its medical responsibilities for the indigent to the State Department of Health. Virginia more recently has done something similar. And if it bears any special significance as the nation's capital, in the District of Columbia the supervision of all public medical service has been under the Department of Health for some years.

Many universities and colleges conduct student health services that provide fairly complete medical care. Departments of public health, both state and local, have little if anything to do with any of them. Health departments could learn much and at the same time make valuable contributions by becoming involved in these programs. Here prevention, care, and health education might be blended in an academic environment.

Medical aspects of the workmen's compensation acts are typically under state departments of labor or special compensation commissions. Yet there would seem to be no good reason why the certification of disability involved in these programs could not be handled, or at least participated in, by departments of public health. Likewise, health authorities should be of great assistance in passing on the adequacy or quality of care rendered to compensation cases. The enactment of a state law for disability benefits in Rhode Island a few years ago, and in California several months ago, opens up new opportunities for medical care administration; but, so far as I am aware, they have not been embraced by public health agencies. Under social insurance acts which compensate the worker who is unemployed because of sickness, there is, of course, constant need for medical certification of disability. This medical administrative task could and should be handled by departments of health, either as a direct responsibility or on behalf of the compensation authorities. Precedent can be found at the federal level for such assignment of responsibility.

The State of Washington has a special program of health services for the "Senior Citizens" of the State—i.e., all persons 65 years of age or over who are public assistance beneficiaries. This program of unusually comprehensive services is supported out of state revenue and is administered with the consultation of the State Department of Health. Such programs in time may extend to other states. The federal-state program of vocational rehabilitation represents another expanding field in which medical administration plays an important part. Today this work is under the supervision of state departments of education in nearly every state, with little if any participation or assistance by state departments of health. Such separation in health responsibilities again operates to the detriment of both programs. At the federal level, medical guidance has been effected through assignment of officers from the Public Health Service to the Office of Vocational Rehabilitation; this pattern might well be adopted in states by the corresponding state agencies.

A medical care program of special significance in rural areas is found in the prepayment health plans of the

Farm Security Administration. These prepayment plans, designed to spread the risk of medical care for low income farm families, and operating in over 1,100 counties throughout the nation, have been organized and supervised by personnel of the U. S. Public Health Service assigned to the Department of Agriculture. Another agency in the Department of Agriculture conducts a special tax-supported program of medical services for migratory farm laborers which has operated in about 30 states. In both of these programs, assistance has been obtained occasionally from health departments, in so far as the provision of preventive measures was concerned, but the characteristic attitude toward the treatment services offered has been one of "hands off," because of the supposedly close resemblance of these two programs to so-called "socialized medicine." Again, lack of participation by health departments works to the detriment of both the agricultural and the health features of these programs.

Over a number of years the federal government has provided comprehensive medical care for designated beneficiaries. These programs afford a medium for state and local participation. The program of the Office of Indian Affairs especially could be adapted to coöperative endeavor because many Indians are dispersed among the general population. Efforts at joint action so far have been desultory since no state has been either willing or able to provide the full range of medical benefits included in the federal program.

Before World War II has been formally concluded, more than 20,000,000 persons will have acquired veterans' rights and this creates another tremendous responsibility in the way of medical care. The medical program of the Veterans Administration, with its special attention to service-connected disabilities, is a direct federal responsibility, although there is a growing tendency to utilize local resources. The veteran has, of course, many needs beyond the care of his service-connected disabilities. There is no good reason why health departments should not be in a position to advise or otherwise assist in the various programs having health implications that are being developed for veterans by a number of agencies.

Then there are all the voluntary prepayment plans which have attained considerable momentum in recent years. Group hospitalization plans under the Blue Cross emblem, the prepayment plans of consumer groups like fraternal orders, farmers' associations or labor unions, industrially sponsored plans, insurance plans promoted by medical societies—all of these represent an important movement in which departments of public health have in the past played little part. While direct management of such voluntary programs must obviously be under nonofficial auspices, there is wide opportunity for public health officials to act as consultants or members of boards of directors in such plans. In this way some coördination between treatment and preventive services might be achieved. As yet no one knows the extent to which some of the ordinary public health services might be discharged through voluntary prepayment hospital or medical service plans. Another problem from the standpoint of public administration is to develop controls over content and quality of service within the terms of the voluntary plan contract. Mere actuarial soundness, now the main requirement, is of only minor consideration in the usual "service plan" (as distinguished from indemnity plans), while the content and character of the service itself is of first importance. In this determination health departments might perform an important public function.

A strong stimulus to participation of public health agencies in planning hospital construction has been given by the introduction in Congress of the National Hospital Survey and Construction Bill. This calls for the designation of a state agency which will be responsible for developing state-wide "master plans," determining overall needs, and designating places where new hospitals should be built. In preparation for the passage of such a bill, which would provide extensive grant-in-aid funds for hospital construction over the next five years, some 15 states have passed measures which call for state-wide surveys of hospital needs, and about 25 additional states and territories have taken other actions. Under these acts the health department is generally involved either as the executive agency or in an advisory capacity. Thus it is apparent that legislative authorities are disposed, more and more, to assign responsibilities for different elements of medical care to the health department. They have reached the obvious conclusion that the health department already is or should become the center of competence in this field.

The task of distributing vast quantities of surplus war property presents another, but perhaps temporary, phase of medical care administration. This program calls for the coöperation of state and local departments of health if full advantage is to be taken of the opportunities for furnishing hospitals and health centers with needed medical equipment and supplies, and for improving sanitation facilities. While the volume of surplus property, especially consumer goods, actually coming into the possession of health and medical agencies may be disappointing, this may in some measure be attributed to two factors: the absence of satisfactory inventories of need, and the inability of claimants to pool their needs in advance, thus being in position to take possession of articles promptly in the kinds and quantities that are available.

The entire task of encouraging a better distribution of physicians and other medical personnel, particularly between urban and rural areas, represents a striking instance where health departments can play a key rôle in the medical care field. This is a problem of long standing which the adverse economic position of rural areas continues to aggravate. Not less than four states—North Carolina, Virginia, Georgia, and Kentucky—seriously contemplate or have enacted laws providing medical fellowships to young men and women who will agree to practise in a designated rural area for a certain number of years after graduation. Determination of areas of doctor shortage, at least in the case of North Carolina, is a responsibility placed upon the State Department of Health, so that this agency finds itself entrusted with another type of medical care function. The problem, however, is by no means limited to the four states that have overtly recognized it. Other states may be expected to take even more aggressive steps and their health departments should anticipate the need for action.

The list of medical care functions in which public health agencies might participate could be extended, but the length to which I have gone may be sufficient to call attention to the opportunities at hand. At any rate, there is no substantial reason why the enactment of measures providing for a comprehensive medical care program should find health departments totally unprepared for the tasks it may impose. The varied programs, which are daily increasing in number and complexity, give official public health agencies wide opportunity to acquire some degree of "know how" in the field of medical care administration. They provide opportunity to gain intimate knowledge of

the complex relationships involved in delivery of modern medical service. Economic relationships with physicians, dentists, hospitals, nurses, optometrists, laboratories, and other vendors of medical care are daily aspects of these programs. Definitions of eligibility for medical care; authorization for service where necessary; determination of the scope of benefits allowable within the funds at hand; allocation of funds to special accounts for different classes of service; development of agreements with professional bodies, including methods of payments, control over abuses, referral to specialists and to resources outside the local area; education of patients concerning benefits and limitations which may be necessary; the preservation and encouragement of a high quality of service; maintenance of records, and numerous other administrative matters—these problems in varying degrees and forms characterize medical care programs operating today throughout the nation under different auspices. There is hardly any item under the provisions of such a measure as the National Health Bill of 1945 on which knowledge could not be gained, if today health officials were, figuratively speaking, to look in their own back yards for the experience.

Should health departments be so cautious or obtuse as not to accept the challenge, responsibility for administering overall medical care programs will of necessity fall into other hands. It may fall under the aegis of welfare departments; it may be sponsored by professional bodies as producer operations; or it may be set up under some totally new public agency. If responsibility falls to the welfare department it will be in the hands of an agency with the most humanitarian intentions, but one not skilled by tradition or current operation in the field of health services. If responsibility falls to the professional societies it will be in the hands of groups who are technically informed on service content, but being a vested interest, one would not expect them to be actuated primarily by considerations of public need, nor particularly skilled in socio-economic affairs. If responsibility falls to some new public agency, the administration of medical care will be rendered more unwieldy than ever in relation to a total health program. In none of these three possibilities will the ideal of intimate coördination with preventive programs be achieved. Should any of these three possibilities materialize, the program remaining to the public health agency would be dwarfed by comparison into insignificant proportions.

It is in the public interest, therefore, that medical care functions be developed in public health agencies. Knowing health departments so well, we in public health work are apt to regard them as wholly unprepared for the assumption of such a great new task, but they are strong and competent as compared with other aspirants. Everyone can be confident that if the task were put upon their shoulders they would learn how to bear it. On this very point, no better phraseology is to be found than in the official statement of the American Public Health Association with respect to the part of health agencies in a national health program. It was adopted by the Governing Council October 4, 1944:

> A single responsible agency is a fundamental requisite to effective administration at all levels—federal, state, and local. The public health agencies—federal, state and local —should carry major responsibilities in administering the health services of the future. Because of administrative experience, and accustomed responsibility for a public trust, they are uniquely fitted among public agencies to assume larger responsibilities and to discharge their duties to the public with integrity and skill. The existing public health agencies, as now constituted, may not be ready and may not be suitably constituted and organized, in all cases, to assume all

of the administrative tasks implicit in an expanded national health service. Public health officials, however, should be planning to discharge these larger responsibilities, and should be training themselves and their staffs. This preparation should be undertaken now because, when the public comes to consider where administrative responsibilities shall be lodged, it will be influenced in large measure by the readiness for such duties displayed by public health officers and by the initiative they have taken in fitting themselves for the task.

The statement just quoted is sound today, and it is even more applicable now than when it was adopted. Then we were in the middle of a great war that had drawn into the armed forces a high proportion of active public health workers. Now we are in position to fill those gaps. The serious defects in our organization for medical care and the consequent inadequacies of service have become items of common knowledge.

Likewise, the applicability of insurance in meeting the unpredictable costs of illness now finds general acceptance; the only question at issue is whether it shall go forward under private auspices or within the framework of government. Even the most ardent advocates of voluntary schemes openly admit that part of the burden must be assumed by government, and perhaps an element of compulsion may be necesary to assure full and continuous coverage of the population. As a matter of fact, bills are now before the Congress for extending health services through each of these devices; one contemplates a national compulsory health insurance system while the other would foster voluntary systems, but would subsidize them for the purpose of covering persons unable to meet regular premium costs. No stretch of the imagination is needed to anticipate that measures of similar intent will continue to come before state legislatures in future sessions, as they have in the past.

Despite their timidity and backwardness, health departments are coming to be recognized as the appropriate agencies for administering those elements of medical care that may be accepted as a public responsibility. They can now enter the field with reasonable assurance, in most areas, that they are welcome and will be fully accepted when their interest and competence have been demonstrated. Lacking precise information on some technical matters, they need not feel embarrassed provided they are willing to learn. A vast body of basic facts and operating experience has been acquired by governmental agencies and voluntary insurance plans. Much of this information is available through published documents, but in addition personal contact should be made with individuals whose position has been established in one or another aspect of this broad field.

The U. S. Public Health Service began as the medical care organization of the federal government. In fact it operated one of the early, if not the first compulsory health insurance schemes in the world. This was established to assure care for members of the merchant marine. Throughout its existence the Service has been in close touch with organized plans for providing medical service. When confronted with the need for counsel or support in any aspect of medical care administration, state or local health agencies may call on the U. S. Public Health Service. Within the limits of available resources, this aid will be given as another element in its traditional plan of developing and supporting state and local health organizations.

Varieties of Coccidioidal Infection in Relation to the Epidemiology and Control of the Diseases*

CHARLES EDWARD SMITH, M.D., F.A.P.H.A., AND
RODNEY R. BEARD, M.D., F.A.P.H.A.
Department of Public Health and Preventive Medicine, Stanford University School of Medicine, San Francisco, Calif.

MAJOR E. G. WHITING, M.C., AUS
Berkeley, Calif.

AND

MAJOR H. G. ROSENBERGER, M.C., AUS
Whittier, Calif.

FOR over forty years the only recognized form of coccidioidal disease was the usually fatal progressive coccidioidal granuloma. Then the recognition by Gifford and Dickson[1-4] that *Coccidioides immitis* causes an illness which is benign and self-limited enormously broadened this concept. Their addition of coccidioidal erythema nodosum ("Valley Fever") created a true disease spectrum.[5, 6] However, many questions were raised in the process. Coccidioidin skin testing had shown that a large proportion of the individuals of the southern San Joaquin Valley reacted, yet the coccidioidal erythema nodosum ("Valley Fever") of Gifford and Dickson was certainly not universal. Meyer,[7] commenting on the apparent susceptibility of newcomers and immunity of residents, speculated on the likelihood of subclinical immunizing infection. Subsequent studies have indicated that the disease spectrum is very broad and that the segment in which erythema nodosum occurs is only a small part of clinically manifest benign coccidioidomycosis. Moreover, experiences in our own laboratory group indicated that the infection could be acquired without any symptoms whatsoever. Thus coccidioidomy-

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cosis would fall in line with other *infections inapparentes* as first designated by Nicollé.[8] The disease spectrum, even including benign manifestations, would then constitute only a part of the entire infection spectrum. The quantitative composition either of the disease or of the entire infection spectrum was an enigma. One tentative suggestion was made[9] that as newcomers acquired their infections perhaps 1 in 20 developed erythema nodosum. However, without a controlled group which could be studied over a period of years only conjecture was possible.

The location of Army air fields in the San Joaquin Valley to take advantage of the unusually fine meteorological and topographic conditions in year round training provided an opportunity for the requisite intensive study. While even "permanent" personnel moved through these stations at a rapid pace, enough remained a sufficient length of time to permit an evaluation of the infection spectrum. In a subsequent paper a discussion of the clinical manifestations will be presented.

As has previously been described,[10] the permanent personnel of four San Joaquin Valley Army Air Fields were routinely coccidioidin tested on their arrival at their stations. The negatives were retested periodically. Those who reacted at their retest were carefully interrogated as to any interim illness, and their form 52A infirmary records and any hospital records were inspected. If they gave no history of an illness which could be suspected as coccidioidal, they were classed as "inapparent" infection. If they had an illness such as "flu" (when there was no epidemic influenza) or pleural pain suspicious of coccidioidomycosis but did not report for medical attention, they were classed as "atypical" or "subclinical" cases. If they had these symptoms and reported to sick call but were not diagnosed as coccidioidal, they were classed as "missed" cases. "Clinical" cases were the patients who were correctly diagnosed. Only the "clinical" cases present at the Fields at the time of the retests were compared with the other categories. Special note was made of erythema nodosum. Because only "inapparent" infections and possibly some "atypical" cases were revealed at Merced and these in very small numbers,[10] the final comparison was

TABLE 1

Distribution of Primary Coccidioidal Infections by Type at Minter, Gardner, and Lemoore Army Air Fields July 1, 1941, to December 31, 1945

	Diagnosed Cases			*Missed and Subclinical Infections*			*Inapparent Infections*		*Total Number of Infections*
		Per cent of Infections			*Per cent of Infections*				
Field	*No.*	*With Symptoms*	*All*	*No.*	*With Symptoms*	*All*	*No.*	*Per cent of All*	
Minter (1941–1945)	171	59.6	26.5	116	40.4	18.0	359	55.6	646
Gardner (1941–1944)	108	64.3	25.0	60	35.7	13.9	265	61.1	433
Lemoore (1942–1945)	53	58.2	19.5	38	41.8	14.0	181	66.5	272
Total	332	60.8	24.6	214	39.2	15.8	805	59.6	1,351

restricted to Minter, Gardner, and Lemoore Fields. The negative results at Merced served as a control, establishing that the initial testing and subsequent retesting were valid procedures.

In Table 1 are presented the data showing the distribution of 1,351 coccidioidal infections. One observes that only approximately one in four of the infections was diagnosed while approximately 60 per cent were symptomless. Actually, only 60 per cent of those with clinically manifest disease were detected as clinical cases. The remaining 214 with symptoms but not diagnosed were approximately equally divided between those missed by the doctors and those who "toughed out" their illnesses. The close approximation of the distribution in the various fields is further evidence of the validity of these observations. Broken down by years, the proportion of inapparent infections was also constant but there was an increasing proportion of clinically diagnosed cases. In the first year the percentages of diagnosed disease ran 15.2 (Minter), 15.2 (Gardner), and 15.8 (Lemoore). The "atypical" ("subclinical") and "missed" cases were reduced and contributed to the proportion of clinical cases as the succeeding groups of medical officers became more skilled in diagnosis and as the personnel became increasingly aware of "Valley Fever."* Several of the personnel who developed their clinical manifestations while on furlough or leave made their own diagnoses, usually being unable to convince the physicians whom they consulted until they returned to their home fields.

The frequency of coccidioidal erythema nodosum or erythema multiforme, the true "Valley Fever" of Gifford and Dickson, warrants special attention. Not only is it important historically, but also does it constitute a clinical picture sufficiently spectacular not to be overlooked. Recognized readily, it may be used as an index of infection, if an appropriate factor relating it to the other forms of the infection can be established. Of course, even in known coccidioidal endemic areas not all erythema nodosum is coccidioidal. Out of 453 cases of erythema nodosum[9] in the San Joaquin Valley 432 (95 per cent) were coccidioidal while 11 of the remainder were probably tuberculous, and the cause of the other 10 not determined. In our current studies on several occasions erythema nodosum appeared during the course of sulfonamide therapy, and when the patient had a preceding atypical pneumonia which failed to respond to chemotherapy, the clinical picture mimicked coccidioidal erythema nodosum. However, the absence of coccidioidin sensitivity and coccidioidal serology and prompt disappearance of the lesions on cessation of the drug ruled out coccidioidomycosis. Therefore, in any attempt to use the criterion of erythema nodosum as an index of coccidioidomycosis the etiological proof of each case must be established carefully.

In Table 2 is presented the frequency of erythema nodosum or multiforme. The proportion in total infections was 4.6 per cent, ranging from 4.0 per cent at Lemoore to 4.9 per cent at Minter. This closely approximates the crude estimate of 1 in 20 previously made.[9] It also checks with the 4.4 per cent incidence of erythema nodosum occurring in the Willett and Weiss[11] series of 135 infections. One notes that 11.4 per cent of all those having symptoms had erythema nodosum or multiforme, and 18.7 per cent of those with clinically diagnosed coccidioidomycosis had these skin lesions. Occasionally confusion has arisen between infection

* While "Valley Fever" originally meant coccidioidal erythema nodosum, its popular use has broadened to include all clinically manifest coccidioidomycosis.

and disease. While approximately 5 per cent of our coccidioidal infections had erythema nodosum, 20 per cent of the clinically diagnosed cases had the lesions. In the series of 85 clinical cases reported by Goldstein and McDonald,[12] 17, or exactly 20 per cent, had these manifestations. The series of Willett and Weiss[11] and of Goldstein and Louie[13] and Goldstein and McDonald[12] as well as the great proportion of ours were in males. The predilection of females for erythema nodosum in coccidioidal infections was previously noted.[9] The ratios as given above would be applicable only for males, or possibly children among whom the increased incidence of erythema nodosum in females is not so marked.[9]

In 1943 members of the Women's Army Corps were assigned to the Fields and provided a group for comparison. However, their numbers were small, and, because they moved through so rapidly, there were a total of only 41 infections for comparison. Ten, or one-quarter, had erythema nodosum or multiforme (Table 3). Also, one-half of the clinically diagnosed female patients had erythema nodosum. One notes the much higher proportion of clinically diagnosed cases and smaller proportion of inapparent infections in the females. These differences reflect the frequency with which the allergic manifestations[9] convert what would otherwise have been unrecognized infections to spectacular, unmistakable clinical cases. One notes that when the females are eliminated from the computation the incidence of erythema nodosum in whites drops to 4.3 per cent which is even closer to the 4.4 per cent of Willett and Weiss.[11]

Another point of consideration is the effect of race on erythema nodosum. Negroes came to the Fields in 1941, but remained in any appreciable numbers only at Minter Field. They provided 92 infections for comparison (Table 4). In none did erythema nodosum occur.

TABLE 2

Frequency of Erythema Nodosum and Erythema Multiforme in 1,351 Coccidioidal Infections at Minter, Gardner, and Lemoore Army Air Fields, July 1, 1941, to December 31, 1945

		Erythema Nodosum or Multiforme		
		Per cent of Infections		
Field	No.	Diagnosed Cases	With Symptoms	All
Minter	32	18.7	11.1	4.9
Gardner	19	17.6	11.3	4.4
Lemoore	11	20.8	12.1	4.0
Total	62	18.7	11.4	4.6

TABLE 3

Distribution of Primary Coccidioidomycosis in Whites by Sex and Type at Minter, Gardner, and Lemoore Army Air Fields July 1, 1941, to December 31, 1945

	Diagnosed Cases			Missed and Subclinical Infections			Inapparent Infections		Erythema Nodosum				
		Per cent of Infections			Per cent of Infections					Per cent of Infections			
Sex	No.	With Symptoms	All	No.	With Symptoms	All	No.	Per cent of All	No.	Diagnosed Cases	With Symptoms	All	Total Number of Infections
Females	20	80.0	48.8	5	20.0	12.2	16	39.0	10	50.0	40.0	24.4	41
Males	285	58.5	23.4	202	41.5	16.6	731	60.0	52	18.2	10.7	4.3	1,218
Total	305	59.6	24.2	207	40.5	16.4	747	59.4	62	20.3	12.1	4.9	1,259

TABLE 4

Distribution of Primary Coccidioidomycosis in Males by Race and Type at Minter, Gardner, and Lemoore Army Air Fields July 1, 1941, to December 31, 1945

	Diagnosed Cases			Missed and Subclinical Infections			Inapparent Infections		Erythema Nodosum				
		Per cent of Infections			Per cent of Infections			Per cent of		Per cent of Infections			
Race	No.	With Symptoms	All	No.	With Symptoms	All	No.	All	No.	Diagnosed Cases	With Symptoms	All	Total Number of Infections
Negro	27	79.4	29.3	7	20.6	7.6	58	63.1	0	0	0	0	92
White	285	58.5	23.4	202	41.5	16.6	731	60.0	52	18.2	10.7	4.3	1,218
Total	312	59.9	23.8	209	40.1	16.0	789	60.2	52	16.7	10.0	3.9	1,310

This coincides with experience in 432 civilian cases of coccidioidal erythema nodosum in which none were in Negroes.[9] Willett and Weiss[11] reported two Negroes with erythema nodosum in their series, both having mixed ancestry. Thus, while it may occur, erythema nodosum is much less frequent in the Negroes. Including the colored, our overall male erythema nodosum proportion was just under 4 per cent. As there were no female Negroes in the groups exposed to infection, it was not possible to determine whether sex or race would have dominated with regard to predilection for erythema nodosum.

The cause of real concern in coccidioidomycosis is whether coccidioidal granuloma may ensue. Before we attempt to estimate frequency of dissemination, certain other aspects should be considered. First of all, when do the infections disseminate? If, as in tuberculosis, progressive disease occurs years after infection is acquired, then observation for months or even a few years is inadequate. In a subsequent paper we shall review the matter of pathogenesis. Suffice it to say that of the 12 disseminations we encountered, one occurred within 12 days of onset, another 17 days after onset, 4 more within 3 weeks, 2 more within 1 month (a total of 8 of the 12 within 1 month), 2 more within the 2nd month, 1 more in the 3rd, another within 3½ months, and the longest interval was 4 months after the onset of the initial illness. The sequence of events in the last patient is not clear as he was an "atypical" case (did not report when he was ill with his initial infection in August). When he was seen with meningitis in December, he was not oriented. Apparently there had been an interval of several months (four at a maximum) in which he was symptomatically well. Whether his sedimentation rate and serology would have given clues to his future trouble one cannot say. The 2 with the next longest intervals continued to have occasional fever, elevated sedimentation rates and their titers of complement-fixation steadily rose so that we feared and warned against trouble.

It is thus apparent that most of the disseminations occurred during the course of the initial illness and in none was there a long latent period. This is also the experience of the entire Western Flying Training Command.[14] While our opportunity of following those who were infected at an individual installation was frequently interrupted, others infected elsewhere transferred in so that a minimum of one-quarter of the personnel were coccidioidin reac-

tors. However, the only disseminations were in those recently infected. Moreover, our responsibility for performing the serological tests for the entire Training Command, and the close liaison with the Training Command would have assisted in detecting disseminations elsewhere. We can feel reasonably sure that a dissemination years later must be very unusual. Thus the twelve disseminations which we note here probably constitute a fair basis for calculating probabilities of developing coccidioidal granuloma.

However, other aspects must also be considered. Sex plays an important rôle in coccidioidal disseminations. The pioneer workers in the field recognized the predilection for males. When Wolbach[15] reported the 24th coccidioidal granuloma patient, he emphasized the fact that this was the first female. Beck[16] reported the coccidioidal granuloma sex ratio as nearly 6 males : 1 female while Gifford and her associates[17] found their ratio was approximately 4 males : 1 female. The belief prevailed that coccidioidal granuloma was more frequent in males because males were more often infected. However, in an unselected series of 432 erythema nodosum patients subsequently assembled,[9] there were over twice as many females as males. Coccidioidin testing carried out in the Kern County schools showed no difference in sex or race. None of the infections acquired by females in the San Joaquin Valley Army Air Fields disseminated, but the number infected was so small that none would have been anticipated were the white male ratio applicable.

While our estimates will be confined to males, we must take into consideration the factor of race. Every reported series of coccidioidal granuloma patients indicates the high proportion in Negroes, Mexicans, and Filipinos. The most useful comparison is that by Gifford and her associates[17] wherein they pointed out that the Caucasians comprising 87 per cent of the population of Kern County contributed 41 per cent of the total cases while the non-whites with only 13 per cent of the population provided 59 per cent of the cases. Estimated on a case rate per population basis, the Mexican rate was 3.5 times, the Negro rate was 14 times, and the Filipino rate 180 times the white. Their coccidioidal death rates per 100,000 population were for the Mexicans 5 times, the Negroes 23 times, and the Filipinos 192 times that of the whites.

Therefore in estimating the disseminations in our males with coccidioidal infections it is necessary to consider our Negroes separately from our whites. There were so few Mexicans or other groups that they are included with the whites. There were 710 clinically diagnosed cases of coccidioidomycosis in white males of the four Army Air Fields (the few recognized at Merced, acquired elsewhere, being included here). Using the factor 23.4 per cent (Table 4) as a means of calculating the total number of infections which these diagnosed cases represented, the estimate would be 3,034. Of the 710 diagnosed cases, 110 had erythema nodosum. Table 4 indicates that 4.3 per cent of the infections in the white males occurred with erythema nodosum, so the 110 would represent 3,024 coccidioidal infections. The estimates check quite closely. Eight of our whites had disseminated infections representing 1.1 per cent (1:90) of the clinically diagnosed cases, and 0.26 per cent (1:380) of the total infections. Three of the 8 died.

In the colored group there were 34 clinically diagnosed cases. It is of interest that, as Table 4 indicates, the proportion of inapparent infections is similar in the two races. The proportion of clinically recognized infections is slightly higher despite the absence of attention-arresting erythema nodosum.

We cannot calculate number of infections on the basis of the erythema nodosum ratio, but as 29.3 per cent of the total infections were clinically diagnosed, the 34 cases would represent 116 infections. In this group 4 disseminations (2 fatal) occurred. This gives an incidence of disseminations in 12 per cent (1:8) of the cases, and 3.4 per cent (1:29) of the infections. The disseminations in the Negroes were over 10 times as frequent as in whites, both with respect to diagnosed cases and total infections.

There have been few instances of sufficiently large series to permit comparisons with our estimates. In the epidemic of coccidioidomycosis involving an armored division reported by Goldstein and Louie,[13] there were 17 cases of erythema nodosum or multiforme. Using our factor of 4.3 per cent, this would represent 395 infections. There were 75 clinically diagnosed cases, which with our factor of 23.4 per cent would indicate 320 infections. There was actually one dissemination. Our figure of white males was 1 dissemination in 90 cases and in 380 infections. Willett and Weiss[11] had 49 clinical cases in Negroes with 4 disseminations, or approximately 8 per cent. They commented on their almost "unbelievably high" rate of dissemination, but it agrees relatively well with our own estimate of 12 per cent. During the same exposure none of their 34 whites who underwent clinical infections disseminated. For the entire Western Flying Training Command, Lee[14] and Jamison[18] suspect even a higher risk for the Negro.

COMMENT

The fact that 60 per cent of coccidioidal infections are symptomless places them with tuberculosis, diphtheria, brucellosis, and most other infections in which overt disease is the exception. The infection spectrum is very broad, proceeding from completely inapparent infections through those with mild symptoms which are rarely diagnosed, on to those with full-blown disease: malaise, chills, fever, pleural pain, cough, headache. At the extreme end of the spectrum is disseminated or progressive disease (coccidioidal granuloma) with a case fatality of 30 to 60 per cent. Even under the most favorable of circumstances, when diagnosis could usually be attained by noting the development of sensitivity to coccidioiden (personnel having been tested previously), only 20 to 25 per cent of the infections were clinically recognizable.

One segment of the infection spectrum is readily identifiable, the patients who have the allergic manifestations of erythema nodosum with or without erythema multiforme. This manifestation is infrequent in Negro males. In white males it occurs in approximately 4 per cent of the infections and 20 per cent of the cases. It is much more frequent in females, at least after puberty. In our series of white adult females, 25 per cent of the infections and 50 per cent of the clinical cases were accompanied by erythema nodosum or multiforme. Thus, while erythema nodosum provides a convenient red flag for estimating incidence of coccidioidal infection, it is not applicable for Negroes and allowance must be made for the sex distribution of the group considered.

In considering the frequency of disseminated infections, allowance for the difference in sex and race is also necessary. In our group of white males, approximately 1 in 100 of those clinically diagnosed and 1 in 400 of those infected underwent dissemination. On the basis of a female dissemination frequency one-fifth as great, one would anticipate coccidioidal granuloma in approximately 1 in 500 clinical cases and 1 in 2,000 infections of white females. Even more striking is the difference in race. The

Negro male dissemination ratio, both with respect to cases and to total infections, is approximately ten times that of white males. While the higher tuberculosis rate in Negroes is frequently attributed to inferior housing, nutrition, and medical care, in this Army group these factors were the same. The only valid difference lay in the genetic factors. In 1937 Meyer[7] anticipated these findings: "Just as in tuberculosis the ability to focalize the childhood tubercle is conditioned by genetic factors, so the resistance to generalization of fungus coccidioides is perhaps influenced by similar factors." Indeed, as time has gone on, it has become evident that progressive coccidioidomycosis is analogous with the overwhelming tuberculosis of infancy and very early childhood, rather than with the reinfection type of tuberculosis. Whites have not had the generations of experience with *Coccidioides* which would enable them to become better adapted to survival. Their contact with *Coccidioides* is as virgin as that of the Negro. However, one wonders if the many generations of experience with the parasitism of *Mycobacterium tuberculosis* may not have better equipped them to cope with the pathogenic saprophyte, *Coccidioides immitis*.

SUMMARY

By a program of systematically testing with coccidioidin new permanent personnel at four San Joaquin Valley Army Air Fields and periodically retesting those originally negative, the proportion of the various types of coccidioidomycosis was ascertained. Sixty per cent of 1,351 infections were symptomless and only 25 per cent of the infections were clinically manifest and diagnosed.

Erythema nodosum occurred in 4.6 per cent. It provides an index of infection, although care must be used, since it is found rarely in Negroes and there is a marked difference between the sexes. For this group of coccidioidal infections in young adults it occurred in 24 per cent of the white females and in 4.3 per cent of the white males.

Disseminations occurred in about 1 per cent of the clinically manifest infections in the white males and one-quarter per cent of their total infections. The disseminations were over ten times as frequent in the Negro males, occurring in about 12 per cent of the clinical cases and in about 3½ per cent of the total infections.

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Streptomycin for Clinical Research Related to Tuberculosis

The American Trudeau Society, the medical section of the National Tuberculosis Association, will handle the distribution of a limited amount of streptomycin for clinical experiments in the treatment of tuberculosis. This announcement was made recently by Dr. H. McLeod Riggins, President of the society.

The object of these studies will be to determine the possibilities and limitations of streptomycin in the treatment of tuberculosis and to learn whether the drug is sufficiently effective to justify increased commercial production. The present high cost and limited quantity of the drug makes it impossible to supply many well qualified investigators or to assign it for individual cases regardless of the degree of urgency.

At the request of the Civilian Production Administration and a group of pharmaceutical manufacturers, Dr. Riggin has appointed a special committee to correlate carefully planned clinical research studies to be carried out in hospitals and sanatoriums designated by the Executive Committee of the American Trudeau Society. The chairman of this committee is Dr. H. Corwin Hinshaw, Mayo Clinic, Rochester, Minn., who has conducted studies in streptomycin for the past two years. He warns that it has not yet been sufficiently tested to warrant large scale production and use in the treatment of tuberculosis and emphasizes that it cannot be regarded as a substitute for present methods of sanatorium and surgical therapy.

An Outbreak of Trichinosis in New York City

With Special Reference to the Intradermal and Precipitin Tests

HOWARD B. SHOOKHOFF, M.D., WILLIAM B. BIRNKRANT, M.D., AND MORRIS GREENBERG, M.D.

Bureau of Preventable Diseases, Department of Health, New York, N. Y.

DURING February, and March, 1945, New York City experienced the largest outbreak of trichinosis in the history of its Health Department. Eighty-four persons became ill with the disease as the result of the consumption of pork products supplied by a single wholesaler. We are reporting this outbreak, not only because of its size, but also because it has afforded an opportunity to study the utility of the intradermal and precipitin tests. Very few reports of the application of these tests in large outbreaks have appeared in the literature, and in some instances they were carried out late in the course of the illness. In this outbreak, the tests were made by or at the request of the attending physician during the actual illness as a method of clinical diagnosis, rather than as an afterthought. The results obtained give some idea therefore of the value of these tests to the diagnostician.

We have reviewed the outbreaks of trichinosis involving 20 or more cases reported since 1900. We were able to find accounts of 25 in the publications available to us. They are listed in Table 1.

CIRCUMSTANCES OF THE OUTBREAK

On March 13, 1945, 3 persons in a family of 4 were reported ill with trichinosis. They had purchased mettwurst and blutwurst on February 16, and had eaten these products between that date and February 20. From March 13 through March 31, 81 other cases were found by the Health Department in individuals who had consumed pork products processed by the same wholesaler * who had supplied the meat eaten by the first group of 3. These products were purchased from eight retailers, all supplied by that wholesaler, as well as from a retail outlet operated by the wholesaler. Fifty-three of the 84 cases were traced to a single popular retail store located in a section of the city which is frequented by persons of Germanic birth or descent.

The wholesaler prepared a variety of smoked pork products. Table 2 shows the type of pork eaten by the 84 persons who subsequently became ill. A number of individuals had eaten more than one type, but 50 of the 84 had consumed mettwurst. Investigation disclosed that the pork used in preparing the meats eaten had not been subjected to the freezing process recommended for pork products intended to be consumed uncooked. In the past the wholesaler had used pork maintained at 5° F. for 20 days. However, during the war period

* Thanks are due to Mr. Joseph Schiftner of the Bureau of Food and Drugs for obtaining information concerning the wholesaler.

TABLE 1

Outbreaks of Trichinosis Since 1900

Year	Author	Place	Cases With Symptoms	Cases Without Symptoms	Deaths	Cases		Source
						Male	Female	
1914	McClure and Ware [1]	New Liberty, Iowa	28	2	0	15	15	Sausage cakes, raw ham
1922	Fuchs [2]	Erlangen, Germany	92	..	0	?	?	Sausage
1923	Heissen [3]	Karlsruhe, Germany	150*	..	1	?	?	Not stated
1926	Behr [4]	Vogtland, Germany	70*	..	5	?	?	Not stated
1928	McDonald and Waddell [5]	Albany, N. Y.	26	5	1	21	10	Sausage and salt pork
1929	Willett and Pfau [6]	East St. Louis, Ill.	21	..	1	9	6	Raw pork sausage
1930	Aldridge [7]	Pennsylvania	26	3	2	14	15	"Pork"
1930	Weitz [8]	Stuttgart, Germany	88	..	12	?	?	Polar bear meat
1933	Kilduffe, *et al.*[9]	Atlantic City, N. J.	19	3	1	12	7	Italian sausage
1935	Drake, *et al.*[10]	Portland, Me.	26	25	2	?	?	Home made sausage
1935	New York State Trichinosis Commission [11]	Niagara Falls, N. Y.	20	..	0	?	?	Italian sausage
1936	Barrett and Sears [12]	Rogers City, Mich.	32	..	0	?	?	Sausage
1936	Barrett and Sears [12]	Capac, Mich.	72	..	6	36	36	Sausage
1937	Hallen [13]	Lindesburg, Sweden	50	..	0	9	41	Sausage
1937	Ferenbaugh, *et al.*[14]	Waterbury, N. H.	57	7	0	64†	0	?
1937	New York State Trichinosis Commission [11]	Rochester, N. Y.	85	..	1	?	?	Sausage
1940	New York State Trichinosis Commission [15]	Bronx and Westchester, N. Y.	35	..	0	12	9	Teewurst
1940	Deadman and Wilson [16]	Hamilton, Ontario	23	..	0	7	14	Sausage
1940	Parrisius [17]	German Army, Norway	617	..	1	617†	0	Sausage
1940	Sheldon [18]	Wolverhampton, England	105	..	0	14	78	Sausage
1941	Bacon [19]	Birmingham, England	78	..	0	..	81%	?
1941	Davis and Allott [20]	London, England	26	..	1	20	6	Sausage
1941	New York State Trichinosis Commission [15]	Akron, Ohio	62	..	4	?	?	Sausage
1942	J.A.M.A.[21]	Ft. Stanton, N. Mex.	400	..	?	?	?	Sausage
1943	Vogel [22]	Rock County, Wis.	28	..	0	15	13	Summer sausage

* Approximate † Outbreak in a male population.

B. Saad (*Presse Med.*, 48:556 1940) discusses an outbreak of trichinosis in Beyrouth which was supposed to have involved 500 persons. However, L. Pigoury (*Bull. Soc. Path. Exot.*, 36:88, 1943; abstracted in *Trop. Dis. Bull.*, 42:400, 1945) states, "Only a few human cases were recorded in the 1939-1940 outbreak . . . Rumour magnified the extent . . ." This outbreak has been omitted from the table.

the refrigerating companies licensed to do that type of work had found it more profitable to use their facilities for other purposes, and consequently the practice of freezing the pork had been abandoned.

By the time the existence of an outbreak was recognized, it was impossible to obtain remnants of the meat actually consumed by those who became ill. A large number of samples of pork products subsequently distributed by the same wholesaler were examined with negative results.

CHRONOLOGY AND INCUBATION PERIOD

With the exception of one case in which the accuracy of the history is to be doubted, all illnesses began between February 21 and March 31. The one exception gave the date of the onset as February 10. Of the 84 cases, 59, or 70 per cent, had their onsets between March 7 and March 15. The incuba-

TABLE 2

Type of Pork Product Eaten by Those Ill

Food	*Number of Cases*
Mettwurst	50
Teewurst	12
Blutwurst	10
Jagdwurst	5
Bierwurst	2
Cervelat Sausage	2
Knockwurst	2
Schützenwurst	2
Fleischwurst	1
Brotwurst	1
Braunschweig Sausage	1
Ham bologna	1
"Sausage"	6
Westphalian Ham	9
Pork chops	1
Chopped meat	1

tion period was determined in 62 cases and ranged from 2 to 35 days after the consumption of the pork. In 46, or 74 per cent, the first symptoms came on between 5 and 17 days after eating the pork. Figure 1 shows the distribution of the various incubation periods. In a number of instances, the same pork was eaten over a period of several days, and in such cases the median day was chosen as the day of consumption.

AGE AND SEX DISTRIBUTION

One-half of the cases occurred in persons in the third and fourth decades. Ten cases occurred in individuals under 20 years of age. The cases were equally distributed between the sexes, 42 in males and 42 in females.

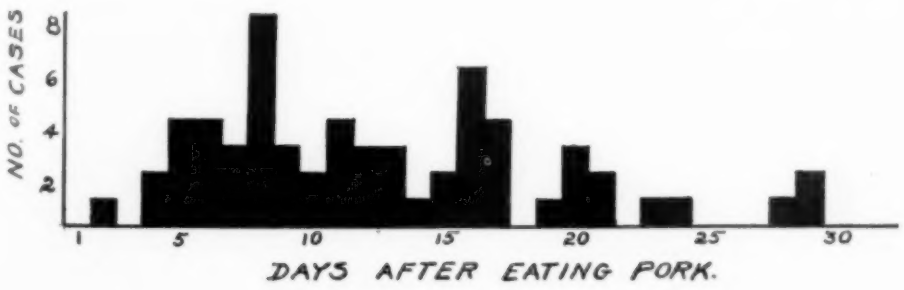
MORTALITY

There were no fatalities and, as a matter of fact, no cases that could be called critically ill. It seems to be characteristic of large-scale outbreaks of recent years, that there frequently is little or no mortality. Among the 26 recorded large outbreaks of the present century, including the one described here, certainly 12 and probably 13 had no fatal cases.

The 4 largest outbreaks, that is, those of more than 100 cases, had mortality rates of less than 1 per cent. No statement as to mortality is made in the report of the Fort Stanton outbreak [21] of 400 cases (crew of the S. S. Columbus). There were 10 outbreaks with between 50 and 100 cases each. In 5 there were no deaths; in the others the case fatality rates were 1, 6, 7, 8, and 14 per cent respectively. In the 12 outbreaks in which there were fewer than 50 cases, there were no deaths in 6. In the other 6 the death rates were 3, 4, 4, 4, 5, and 5 per cent.

These figures are in marked contrast to the epidemics of the last century. The case fatality rate in Wegleben [23]

FIGURE 1
INCUBATION PERIODS.



was 16 per cent; in Hettstädt,[24] 17 per cent; in Hedersleben,[25] 30 per cent, and in Emersleben,[23] 16 per cent.

It seems that trichinosis was a much more severe disease during the last century that it is at present. One reason for this apparent change might be the fact that many mild cases and all subclinical cases went unrecognized until hematology had developed to the point where eosinophilia was readily determined. This would tend to exaggerate the case fatality rates. However, it is difficult to believe it could explain a drop from 15 per cent or more to less than 2 per cent in the majority of the large outbreaks.

It seems likely that the decline in the severity of epidemic, and probably also endemic, trichinosis can be explained by a reduction in dosage of infecting organisms in the average case as a consequence of public health measures and improved eating habits. The enforcement of measures designed to control trichinosis, though not 100 per cent effective, has resulted in a smaller number of infected animals and a lower degree of infection in any one animal. For this reason a given amount of infected muscle contains on the average fewer larvae than in former years.

As a result of the dissemination of knowledge concerning trichinosis, few people deliberately eat uncooked pork with the exception of those accustomed to eating sausage type products, so that sausage seems to have become almost the only important cause of large outbreaks. In the outbreak reported herewith, almost all the cases resulted from the consumption of one or another form of smoked sausage type product (Table 2). In 20 of the 25 outbreaks listed in Table 1 the cause was recorded. All but 2 of these were ascribed in whole or in large part to the consumption of some type of sausage.*

The production of sausage results in a dilution of the infected meat and consequent reduction in dosage in one or both of two ways: (1) the formula frequently calls for the incorporation of non-infected tissue such as liver, blood, and fat. (2) Sausage is usually made commercially from scraps of pork derived from a number of animals so that the muscle tissue of the infected animal occurs in small amounts in a large number of units of production. This dilution accounts for a reduction in concentration of larvae per unit of edible material and at the same time an increase in the number of infected units. The making of sausage is an effective way of distributing the meat of a single infected animal to a large number of individuals. Thus it is that sausage, if infected, is apt to cause large scale outbreaks of low mortality.

The one large 20th century outbreak definitely not due primarily to sausage was that in Stuttgart in 1930. It resulted from the consumption of steaks of bear meat, a concentrated type of product as compared with sausage, and

TABLE 3

Frequency of the More Common Symptoms and Signs

Symptoms	*Number of Cases*	*Per cent*
Lid edema	68	81
Muscle pains	61	72
Fever	60	71
Diarrhea	23	27
Headache	19	23
Abdominal cramps	19	23
Conjunctival hemorrhage	17	20
Nausea	11	13
Vomiting	8	10

* In the case of the outbreak of 1937 at a C.C.C. camp at Waterbury, Vt. (Ferenbaugh, *et al.*), the source was considered to be a loin of pork. This was based on the fact that it was served at the only meal eaten by all those taken ill. Since the first case occurred only 3 days later and since the onset was with signs of the stage of dissemination of larvae (edema of the eyes), it would seem more probable that infection took place earlier. Sausage from an experimental farm was served on three different occasions from 6 to 17 days before the onset of the first case. Thus the sausage might have been the cause and it would not be necessary that all those ill should have eaten the same meal.

TABLE 4

Order of Appearance of Cardinal Symptoms in 57 Cases

Cases with initial gastroenteritis		7
Typical sequence of gastroenteritis, edema, and muscle pain	3	
Gastroenteritis followed by edema and muscle pain occurring simultaneously	1	
Gastroenteritis followed by edema; muscle pain absent	1	
Gastroenteritis followed by muscle pain; edema absent	2	
Cases with onset characterized by periorbital edema		45
Gastrointestinal manifestations present in	15	
Simultaneous with appearance of edema	10	
Subsequent to appearance of edema	5	
Muscle pain present in	41	
Onset simultaneous with edema	20	
Onset subsequent to that of edema	21	
Cases without edema or initial gastroenteritis		5
Fever and muscle pain occurring simultaneously	2	
Fever alone	1	
Muscle pain simultaneous with abdominal cramps and diarrhea	1	
Muscle pain simultaneous with abdominal cramps	1	

was the only recent large epidemic with a mortality comparable to that observed in the early outbreaks of the 19th century.

SYMPTOMS

Table 3 records the main symptoms manifested by the 84 cases in the present outbreak. Edema of the eyelids, muscle pain, and fever were by far the commonest manifestations.

In Table 4 we have analyzed 57 cases in which chronological data were available, with respect to the order of appearance of the cardinal manifestations: gastroenteritis, edema, and muscle pain. Only 7 of the 57 cases had the classical initial gastroenteritis. In 3 of the 7, the classical sequence of gastroenteritis, edema, and muscle pain was noted; in 1, muscle pain and edema came on simultaneously; and in 3, either edema or muscle pain was lacking.

In 45 of the 57 cases, the prominent initial symptom was periorbital edema. In 10 of the 45, gastrointestinal symptoms accompanied the edema, and in 5 more, developed subsequent to the appearance of the edema. In 41 of the 45 cases, there was muscle pain. This came on simultaneously with the edema in 20 instances and subsequent to the edema in 21.

There were 5 cases in which there was neither edema nor initial gastroenteritis. In 2 of these, gastrointestinal symptoms came on simultaneously with muscle pain.

From the experience in this outbreak it appears that the classical initial gastroenteritis occurs in only a small minority of cases. The absence of an initial gastroenteritis in a majority of cases was noted also in the Rock County, Wolverhampton, Birmingham, London, and Lindesberg outbreaks. In the present outbreak, gastrointestinal symptoms were present in 24 of 57 cases, but usually occurred simultaneously with or subsequent to edema and muscle pain. Muscle pain came on simultaneously with the edema or subsequent to it with about equal frequency.

LABORATORY FINDINGS

Eosinophilia—Differential counts of the white blood cells were made in 72 of the 84 cases. The results are summarized in Table 5. In most instances, only a single count was made. In

those cases in which more than one determination was carried out, the highest figure obtained was used.

TABLE 5

Eosinophile Counts in 72 Cases

Per cent Eosinophiles	*Number of Cases*
5 to 9	8
10 to 19	24
20 to 29	19
30 to 39	10
40 to 49	9
50 and over	2

Eosinophilia is best determined on the basis of the absolute number of eosinophiles per cubic millimeter. It is generally accepted that 400 per cu. mm. is the upper limit of normal. In many instances, however, we do not have available a total white blood count from which to derive the absolute figure. Consequently we must use the per cent of eosinophiles as determined by a differential count alone. It is fair to assume in these cases that no total count is less than 5,000 white blood cells per cu. mm. Thus, the finding of 10 per cent or more eosinophiles can be accepted as certain evidence of eosinophilia. On the other hand, eosinophilia cannot be ruled out when there are less than 10 per cent unless the total white blood count is known.

In 64 of the 72 cases there were 10 per cent or more of eosinophiles. But only 1 of the remaining 8 cases showed less than 5 per cent. In that case there were 3 per cent on the 8th day of illness and 6 per cent on the 23rd day. On the latter day, the total white count was 15,500, so that a true eosinophilia of 930 per cu. mm. existed.

The results of differential blood counts were recorded in 18 of the 25 outbreaks listed in Table 1. In 9 of the 18 outbreaks, all cases tested showed eosinophilia. In the remaining 9 outbreaks, the great majority of cases had eosinophilia.

It is generally accepted that determination of the eosinophile count is the most useful single laboratory test for the early diagnosis of trichinosis. This is substantiated in the present outbreak. Of 6 counts done on the first day of illness, 5 were 10 per cent or more. Of 40 counts done during the first week, 34 were 10 per cent or more, and 39 were at least 5 per cent, a figure which would always be considered as a possible indication of increased eosinophiles. Thus, the vast majority of cases will show eosinophilia when they first come to the attention of the physician.

In the present outbreak, there were 10 cases which at some time had a count of less than 10 per cent eosinophiles. In all but one, it was a count done during the first 8 days of illness. The one exception was the case already mentioned in which a determination of the total white count demonstrated the existence of a true eosinophilia.

In those cases in which the first blood count is negative or borderline, the count should be repeated. When this is done, it will be rare not to find eosinophilia. Cases of trichinosis without eosinophilia have been reported[20] but they are so unusual that, in the absence of eosinophilia, the diagnosis of trichinosis should be doubted unless the infecting organism can be demonstrated.

Precipitin Reaction—Precipitin tests * were performed on one or more occasions in 40 of the 84 cases. The results are summarized in Table 6. In only 2 cases were completely negative results

TABLE 6

Results of Precipitin Tests

Where More Than One Test Was Done, Highest Titer Obtained Is Given

Titer	*Number of Cases*
Negative	2
1:80	0
1:160	5
1:320	5
1:640	7
1:1280	21

* All precipitin tests were performed by Dr. Annis E. Thomson, Bacteriologist, Bureau of Laboratories.

obtained. In 5 cases a titer of 1:160 (doubtful positive) was recorded.

Of 7 cases tested during the first 8 days of illness, 2 were negative, one was positive at a dilution of 1:40, and the remaining 4 were definitely positive. Of 25 tests performed during the first 2 weeks of illness, 17 were definitely positive, and only 2 were entirely negative. The remainder were positive in low dilutions. The earliest positive precipitin test in this outbreak was found on the 7th day of illness. The titer was 1:1280.

In the Waterbury outbreak, 57 cases were tested and all were reported positive.* Parrisius[17] reported all of 27 cases tested by serological methods positive. It is likely that practically all cases eventually develop positive precipitin reactions, but the finding may occur too late to be of practical clinical value. Nevertheless, the figures just given show that it is a test of definite value in confirming the diagnosis where there is a reasonable clinical suspicion. It must be kept in mind, of course, that false positive tests are not infrequent and a positive test can be considered significant only when there is additional clinical evidence of the disease.

Intradermal Reaction—The skin test with the 1:10,000 dilution of trichinella antigen commercially available was made in 21 of the 84 cases. The results are summarized in Table 7. In 15 of these a positive test was eventually obtained, but in some instances only after repetition of the test. One case showed a questionable result. The remaining 5 were negative. On the first test, definite positives were recorded in only 11 of the 21 cases.

The earliest positive test was obtained on the 6th day of illness. Of 12 cases tested during the first 2 weeks, 3 showed immediate positive reactions, 1 a delayed positive, 1 a questionable reaction, and 7 a negative result. Of 18 tests done after the first 2 weeks, 13 were positive. In 1 case, clinically very typical, and of moderate severity, skin tests performed during the 2nd and 5th weeks after the onset of the illness and

* The dilution considered diagnostic and the date of the test with relation to the onset of illness were not stated.

TABLE 7

Chronological Study of Skin Tests

Case Number	Weeks After Onset							
	1	*2*	*3*	*4*	*5*	*6*	*7*	*Later*
7	P	..	..	..	..	..	..	..
9	..	..	..	..	..	..	N	..
21	..	..	N	P	..	..	..	..
22	..	..	P	..	..	..	..	..
29	..	N	..	..	N	..	..	N
30	N	..	..	P	..	..	..	P
32	..	..	P	..	..	..	..	..
33	..	N	..	..	..	..	..	..
41	..	..	..	P	..	..	..	..
44	..	..	P	..	..	..	..	..
45	..	DP	P	..	..	..	..	..
46	..	N	P	..	..	..	..	..
47	..	P	..	..	..	..	..	..
48	..	P	..	..	..	..	..	..
54	N	..	..	N	..	..	..	..
55	N	..	..	P	..	..	..	..
59	?	..	..	..	..	..	..	..
60	..	N	..	..	..	..	..	..
69	..	..	..	..	P	..	..	..
70	..	..	..	..	P	..	..	..
71	..	..	..	..	P	..	..	..

KEY: N = negative; P = immediate positive; DP = delayed positive; ? = doubtful

again 3 months after were all negative. These were observed for delayed as well as immediate reactions.

Because of the fact that it is frequently negative early in the illness, and may not become positive for several weeks if at all, the intradermal test for trichinosis is of distinctly limited value.

COMPARISON OF SKIN AND PRECIPITIN TESTS

It is usually stated that the skin test becomes positive in trichinosis during the 3rd week after infection. It is further stated that the precipitin test becomes positive at about the end of the 4th week of infection. These statements appear to give a false impression as to the relative value of the tests with respect to the promptness with which they are likely to become positive. Actually, in this outbreak, the precipitin test tended to become positive earlier in the illness than the skin test. Reference to Table 8 will show that in the 2nd week the precipitin is far more likely to give a positive result. In the later weeks of illness, the precipitin test is in general more often positive than the skin test.

TABLE 8

Comparison of Intradermal and Precipitin Tests

	Week of Illness											
	First			Second			Third			Fourth and Later		
Tests	No.	Pos.	% Pos.	No.	Pos.	% Pos.	No.	Pos.	% Pos.	No.	Pos.	% Pos.
Precipitin	3	1	33	22	16	77	9	7	78	12	11	92
Intradermal	5	1	20	7	3	43	6	5	83	12	8	67

In 12 cases both the skin and precipitin tests were done simultaneously. In 2 cases the tests were repeated, so that a total of 14 simultaneous determinations of the precipitin and intradermal reactions were made in the 12 cases.

The results are as follows: both tests positive, 4; both tests negative, 2; precipitin positive or doubtful positive, intradermal negative, 6; precipitin positive, intradermal doubtful, 1; precipitin doubtfully positive (1:160), intradermal positive, 1.

It appears therefore, that if we must choose between the two tests for early diagnosis, the precipitin test would be the more useful. The precipitin test has an additional advantage in that it seems to have more appeal to the practising physician. It will be noted that twice as many cases were tested by the precipitin method as by the intradermal method in this outbreak. And almost all of the skin tests were performed by Health Department physicians. It is much easier simply to take a specimen of blood and send it to a laboratory than to carry out the skin test, which requires more equipment, more time spent at the bedside, and, if there is no immediate reaction, a second visit to observe whether a delayed positive reaction occurs. Furthermore, the procedure of sending a test tube of clotted blood to a health department laboratory is a much more familiar one to the average physician.

While the skin test has a limited usefulness, it is by no means valueless. More false positive reactions occur with the precipitin test than with the intradermal test. The latter is therefore a supplementary test of distinct value. Furthermore, there was one case in this outbreak in which the precipitin was doubtful at a time when the skin test gave a distinctly positive reaction. It is desirable to use both tests, especially in doubtful cases.

Biopsy—In the present outbreak, no biopsies were performed. Contrary to the prevailing impression, muscle biopsy is a procedure which is of less utility in confirming a diagnosis of trichinosis than the tests already discussed. Since biopsy is not readily repeated, it must be delayed until the optimal time for getting positive results, namely the 4th week after the development of symptoms of generalization of the infection when the bulk of the larvae produced will have arrived at the muscles. It is an expensive procedure and disquieting to the patient. In the Rock County, Wolverhampton, Birmingham, German Army, Waterbury, Portland, Pennsylvania, Albany, and New Liberty outbreaks, a total of 61 biopsies were performed with only 39 positive results.

SUMMARY

1. An outbreak of trichinosis resulting chiefly from the consumption of uncooked sausage-type pork is reported; there were 84 cases and no fatalities.

2. The most common type of onset was with edema of the eyelids and fever. Gastrointestinal symptoms occurred in a minority of the cases and the onset of such symptoms was usually simultaneous with or subsequent to the onset of edema. The classical prodromal gastroenteritis occurred in only 7 cases.

3. Eosinophilia was the most constant early laboratory finding. The precipitin test was found more useful than the intradermal test in diagnosis, since it became positive earlier in the average case.

4. The literature of trichinosis outbreaks of 20 or more cases since 1900 is reviewed. These are characterized by low case fatality rates, probably due to their causation by sausage, in which the infected material occurs in dilute form.

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Record Linkage*

HALBERT L. DUNN, M.D., F.A.P.H.A.

Chief, National Office of Vital Statistics, U. S. Public Health Service, Federal Security Agency, Washington, D. C.

EACH person in the world creates a Book of Life. This Book starts with birth and ends with death. Its pages are made up of the records of the principal events in life. Record linkage is the name given to the process of assembling the pages of this Book into a volume.

The Book has many pages for some and is but a few pages in length for others. In the case of a stillbirth, the entire volume is but a single page.

The person retains the same identity throughout the Book. Except for advancing age, he is the same person. Thinking backward he can remember the important pages of his Book even though he may have forgotten some of the words. To other persons, however, his identity must be proven. "Is the John Doe who enlists today in fact the same John Doe who was born eighteen years ago?"

Events of importance worth recording in the Book of Life are frequently put on record in different places since the person moves about the world throughout his lifetime. This makes it difficult to assemble this Book into a single compact volume. Yet, sometimes it is necessary to examine all of an individual's important records simultaneously. No one would read a novel, the pages of which were not assembled. Just so, it is necessary at times to link the various important records of a person's life.

The two most important pages in the Book of Life are the first one and the last one. Consequently, in the process of record linkage the uniting of the fact-of-death with the fact-of-birth has been given a special name, "death clearance."

IMPORTANCE OF ASSEMBLING THE BOOK OF LIFE

There are many uses for the important records of each person, brought together as a whole. At times, even now, such a collection is of sufficient value that it is made at considerable cost in time and money. Usually, it is the individual who is made to do the work since he alone knows where his records are on file. It is much more difficult for any other person or organization to assemble the records of his life since no personal cross-index exists to lead one to all of a person's records. It is important to many people and organizations to be able to assemble this type of information easily and efficiently.

IMPORTANCE TO THE INDIVIDUAL

Sooner or later most of us need to prove facts about ourselves. The most frequent facts are concerned with birth. Sometimes other facts are needed. Many of these are recorded in the vital records of marriage, divorce, adoption, legitimation, change of name, death and presumption of death. However, it is

* Modified form of paper given before the joint conference of the Vital Statistics Council for Canada and the Dominion Council of Health, held in Ottawa, Ontario, Canada, on May 10, 1946.

not infrequent that facts are required from records of other types than vital records. Such types of records are those made for social security, military purposes, insurance, payment of pensions, professional licenses, hospital care, and a host of others.

At times it is necessary to prove that one is in truth the person to whom the documents refer.

After death, it becomes especially difficult for relatives to assemble even the most important pages of the Book of Life of their dead. Individuals must furnish proof before title to property is transferred or the payment of legitimate claims is made. Missing persons may be alive or dead.

IMPORTANCE TO REGISTRARS OF VITAL RECORDS

No one has a greater stake in the Book of Life than the registrar.

At the present time, he has the first page of each volume. But, although he may also have other important pages under his custody, they are scattered on different shelves of his vault. Some may be in the offices of his fellow registrars.

The registrar's primary responsibility has always been—

1. To obtain completeness and accuracy of registration.
2. To preserve records.
3. To certify from records.
4. To produce statistics from them.

The possibility of satisfying his basic responsibilities could be greatly reinforced if the registrar would take on the additional responsibility of binding the Books of Life into volumes. It is not necessary for him actually and physically to assemble the records of a particular individual and bind them into a volume. For all practical purposes, the end result will be achieved if he creates a Life Records Index indicating *where* all the most important records of an individual are filed.

The accuracy of vital records would be enhanced because of inconsistencies that would show up. The completeness of vital records would be improved because subsequent documents would show that previous records which should have been filed had not been placed on file. Certification would become more secure from fraud. For instance, birth records of dead people could not be certified for fraudulent purposes. Massive certification jobs for government, which of necessity are so often done without charge, could be handled more efficiently and less expensively through a check-off system. Statistical information would become more meaningful because it would be linked to other types of data.

It is not too rash to predict that if the registrars of the country would undertake to prepare and keep up-to-date the Life Records Index on all the people of the country and do the job systematically and efficiently, they would find themselves and their offices to be the focal point of all records concerning people throughout the country. This would probably be accomplished in a surprisingly few years because the need for such a record linkage service is very great. It should be achieved at a relatively small total cost because the mechanism of the task is a very simple one, and, in performing this service, registrars would find that they were doing a particularly fine job in carrying out their primary responsibilities of registration and statistics.

IMPORTANCE TO HEALTH, WELFARE AND OTHER TYPES OF ORGANIZATIONS

Numerous national, state, and local official organizations rely heavily on knowing certain chapters in the Life Records Index of many persons. In order to carry out their assigned tasks, organizations must ask individuals to produce proof of who they are, where and when they were born, to whom they

are married, whether they served in the military forces, and a hundred other questions. Throughout all of this, the organization official must keep in mind the possibility of fraud. "Is this person really John Doe?" "Is his record as recorded true or false?"

After an individual has died, it is particularly difficult for the organization official to tap the facts concerning the records of the deceased. Frequently he does not know whether or not the individual is dead. For example, certain insurance companies systematically send to all fifty-three registration areas in the United States the names of persons with whom they have lost contact and who are presumed to be dead. The companies want to pay insurance benefits if they are due. In addition, they want to clear their books.

To know the fact-of-death whenever or wherever it occurs is of importance to every organization, official or private, that maintains an "active" file on large numbers of individuals. For example, it is costing the United States Government millions of dollars per year to maintain the millions of records of dead people in their active files. Every search for a particular record is complicated and made more costly because the files contain "dead" records. Space costs are reflected in higher rentals and upkeep.

Another reason organizations have an interest in record linkage is that it will help them obtain more meaningful quantitative knowledge about their own programs. Most organizations dealing with individuals produce some type of administrative statistics of the individuals served by them. It would greatly enhance the significance of such statistics if they could be linked to other facts about the same individuals, such as, "What sort of jobs do they hold?" "How many children do they have?" "What sort of illness do they suffer from?" "What kind of social environment do they live in?" In particular health and welfare organizations would find that this type of linked statistical analysis would open new vistas of knowledge to them.

BINDING THE BOOKS OF LIFE INTO A SINGLE VOLUME

There are many ways of binding the Books of Life into volumes. Most of the registration systems in Europe accomplish this end by a central national file. Such systems are reinforced by constant referral to this file through the exercise of police powers. In general, all such systems will find disfavor in the United States.

Several years ago Canada was forced, by the passage of legislation on family allowances, to find an economical and efficient way to link all the vital records of an individual. Annual payments of 250 million dollars required up-to-the-minute and certain proof of the ages and birth order of all children under 16 years of age. It was decided that all customary certification methods were too costly, too slow, and too open to fraud. The system as worked out in Canada has proved to be simple and relatively inexpensive. *It has worked from the start.* It has kept vital records in their proper place, i.e., under the control of public health and statistical agencies. In the near future, it will probably be expanded to include older ages.

The elements of the system are:

1. The Dominion Bureau of Statistics obtains microfilm copies of all vital records: births, deaths, marriages, divorces, adoptions, immigrations and emigrations.

2. It then produces a uniform name index punch card for all such records. The index cards so produced are decentralized by duplicating the cards or by sending printed index lists to the province of birth, regardless of what province a particular record is filed in. In this manner a printed, ledger-type Life Records Index is created for each province from the birth certificate. Each punch card

is presented in this Index as a single printed line of type.

3. Massive certification jobs for governmental purposes are done by check-off against this index in the province of birth.

4. A statistical card is punched by the Dominion Bureau of Statistics at the same time as the name index card is punched.

5. The Dominion Bureau of Statistics codes and tabulates all vital statistics, and publishes the national data. Detailed provincial statistics are turned over to the province for their publication and exploitation.

6. The control of this joint federal-provincial vital records-vital statistics system is under a Council of Vital Statistics made up of the provincial registrars, the Dominion Statistician, and the Directors of Vital Statistics and Census, Divisions of the Dominion Bureau of Statistics.

7. The use of a birth card is being actively promoted throughout all Canada so that the person's identity number (birth card number) can be absorbed in all official records and thus simplify the posting of facts to the Life Records Index.

Canada has gone a long way toward producing a solution of this problem for persons under twenty years of age because of the legislation on family allowances. In addition to the great advance which Canada has made in linking the records of families having children under this age, it is now faced by problems involved in creating a nation-wide prompt clearance of the fact of death.

DEATH CLEARANCE

While this is but a single step in the whole process of obtaining record linkage, it is a most important step. There is so much demand for death clearance that, whatever it cost, the earnings should pay the costs of undertaking the task on a nation-wide uniform basis.

The principal market for this national death clearance system comes from those insurance companies and social organizations and institutions, both governmental and private, which either pay out money upon the death of the individual or which have obligations that are cancelled at the death of the individual. In the aggregate, the market for this type of service is enormous. It is a multiple market, for the fact of death on one individual is needed by various organizations. Ultimately, an average of five to ten purchase orders for such information might be posted against the Life Records Index of each individual for a report of the fact of death whenever the death occurs. Since the deaths of older persons would involve a high percentage of unregistered births, it would probably be economical to handle such records on the basis of a systematic search against state death indexes.

The generalization of a record linkage system to all persons in the country depends primarily on three things:

1. *An efficient Life Records Index to the important records of an individual*—The Life Records Index should be located in the state of birth and must lead to the individual's vital records wherever they might have been placed on file. This cross-index should be arranged in birth certificate number order rather than in an alphabetical name order.

2. *An efficient and prompt inter-state exchange of essential facts* which need to be posted to the Life Records Index—This involves as a minimum the exchange of facts identifying and locating the certificates of marriage, divorce, annulment, adoption, change of name, legitimation and death, whenever they are placed on file in a state other than the state of birth.

3. *The promotion of the widespread use of the Birth Card*—This is the key to efficient record linkage. If the governmental organizations, both federal and state, absorb the birth certificate number into their own records and require that the individual produce it before they obtain services—*Services Which They Need*—people are going to carry their birth cards with them wherever they may go. If the birth certificate number becomes a part of every type of record it will greatly simplify posting to the Life Records Index. The establishment of a nation-wide system of record linkage for all persons in the country will become an invaluable adjunct to the administration of health and welfare organizations and at the same time produce coördinated statistical knowledge of great value. With the birth certificate number as

the binding of the Book of Life and the Birth Card as a device to facilitate the posting to the Life Records Index, all the records on an individual will eventually become linked together. Ultimately, the birth certificate number should be requested as an item in the national decennial census. In this way the wealth of information produced by the census will be linked to the vital records listed in the Life Records Index.

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Order from the Book Service

AMERICAN PUBLIC HEALTH ASSOCIATION

Persistence of Hypersensitivity to Old Tuberculin following Primary Tuberculosis in Childhood*

A Long Term Study

JANET B. HARDY, M.D.

Department of Pediatrics, Johns Hopkins University School of Medicine, and the Harriet Lane Home, Johns Hopkins Hospital, Baltimore, Md.

DURING the past twenty years a steadily increasing number of roentgenograms of the chest of apparently healthy individuals have been taken each year as part of tuberculosis and other surveys. Calcified lesions in the lungs have been noted in varying proportions of these films depending to some extent on the geographic location in which the study was done; Long and Stearns,[18] showed the incidence to vary from 6 per cent in Oregon to 28 per cent in Kentucky. Various authors have reported on, and speculated about, the etiology of such calcified lesions, especially when seen in the chest films of individuals reacting negatively to relatively large doses of tuberculin.

One group of workers [3, 4, 9, 16, 22, 25, 30] have stoutly maintained that in spite of negative tuberculin tests, such lesions may result from a tuberculous infection, either a primary tuberculosis of the bronchopneumonic type or healed miliary tuberculosis. The proponents of this view believe that individuals demonstrating such calcified lesions have had a primary tuberculous infection which either—

a. has been completely healed, allowing a loss of hypersensitivity to tuberculin, or
b. was not at any time accompanied by any obvious degree of hypersensitivity,[21] or
c. has been followed by repeated exposures of minimal degree over long periods,[9] resulting in desensitization.

It has been suggested that if large enough doses of tuberculin, 10 mg. or more, are given, positive reactions may be obtained. We have found such large doses of tuberculin to be unreliable as the percentage of false positive (nonspecific) reactions increases tremendously as the dose is increased above 1.0 mg. Dahlstrom [11] and Lumsden [19] have maintained that in view of the relatively large percentage of calcified lesions found in the chest of tuberculin-negative individuals, the tuberculin test is of little value in epidemiological studies of tuberculosis.

Other workers have speculated about other etiological factors.[17, 28, 31] Many fungus infections have been suggested; Aronson [1] and Cox [7] have shown that coccidioidomycosis will produce such lesions; Sayers [28] on the basis of a study in Oklahoma suggested the *Aspergillus niger*. Christie and Peterson,[5, 6] have been the first to show relationship with the histoplasma. They demonstrated the relationship between positive histoplasmin skin tests and a case of proven histoplasmosis, and have done further extensive studies in Tennessee, reported

* This study was aided in part by a grant from the Commonwealth Fund, by the U. S. Public Health Service and the Maryland Tuberculosis Association.

at the recent (1946) Pediatric Society Meeting at Skytop, Pa., which strongly suggest that this possibility is true. Palmer [26] in a country-wide study on student nurses has also demonstrated significant correlation between the calcified lesions as seen on chest x-ray and positive histoplasmin tests. Emmons has demonstrated cross-sensitivity between histoplasma and other fungi, notably blastomyces.

This study, done with the support of Dr. Carroll E. Palmer and the U. S. Public Health Service, was undertaken in an effort to attack this problem from a different angle. Can these findings be explained on the basis of healed primary tuberculosis? If a group of young children is observed during a primary tuberculous infection and followed periodically into young adult life, does their tuberculin sensitivity persist and what happens to the tuberculous lesions? To state the matter even more simply, can one demonstrate loss of sensitivity to tuberculin following healing of primary tuberculous lesions?

The Harriet Lane Home Tuberculosis Clinic was well equipped to make such a study. This clinic was started in 1928 for the care and study of young children with tuberculosis. About 850 children under 2 years of age at the time of entry have been registered in the clinic. These children have been carefully followed with serial x-rays, periodical physical examinations, and tuberculin tests. Their environments have been closely checked in order to determine the sources of tuberculosis to which they have been exposed, and to gather information as to their diet and general living conditions. Many of these children have not yet reached 15 years of age, and hence were not eligible for inclusion in this study, but as in each instance the whole family group was investigated when the patient was registered and has been periodically checked since, an additional number of suitable individuals was available among the older siblings of registered patients.

As it was not possible to restudy many of the individuals tentatively chosen from the family groups (some were dead, others in the armed services, or had left Baltimore), in order to supplement the number available for the study some additional persons were selected at random from the Diagnostic files of the Harriet Lane Home. These had been patients on the wards or had been followed in the Health Clinic of the Harriet Lane Home where routine contact examinations for tuberculosis are performed. Of a total of 451 available individuals, 333 returned for examination (see Table 1). Of these, 312

TABLE 1

	Positive X-Ray Group					*X-Ray Negative Group*					
	Family Study		*Diagnostic*			*Family Study*		*Diagnostic*			
	W	*B*	*W*	*B*	*Total*	*W*	*B*	*W*	*B*	*Total*	*Grand Total*
Number of Patients											
Suitable for inclusion	159	199	46	79	483	116	201	1	2	320	803
Examined and Completed	81	122	10	17	230	37	43	1	1	82	312
Incomplete	1	0	0	1	2	0	0	0	1	1	3
Discarded	1	9	2	1	13	2	3	0	0	5	18
Not Examined	76	68	34	60	238	77	155	0	0	232	470
In U. S. Service	31	15	8	10	64	22	35	0	0	57	121
Died from											
Tuberculosis	0	2	1	8	11	0	4	0	0	4	15
Other Causes	2	0	1	3	6	1	2	0	0	3	9
Out of State	11	18	7	8	44	11	20	0	0	31	75
Other Causes	0	4	4	3	11	1	13	0	0	14	25
Not Located	2	5	6	14	27	1	15	0	0	16	43
Uncoöperative	28	24	6	13	71	8	39	0	0	47	118
Not Contacted	2	0	1	1	4	33	27	0	0	60	64

FIGURE 1—Present age distribution of 312 individuals included in the study

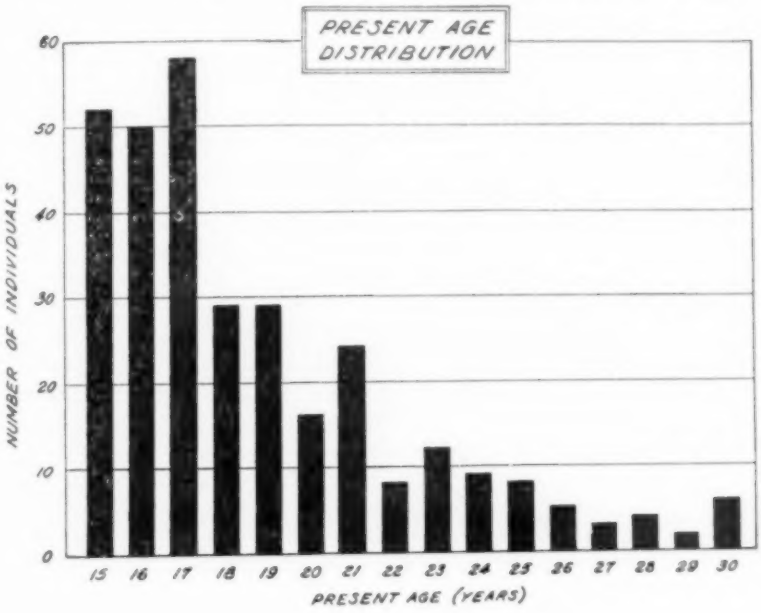

FIGURE 2—Distribution by age of the individuals in this study when first observed to be infected with tuberculosis

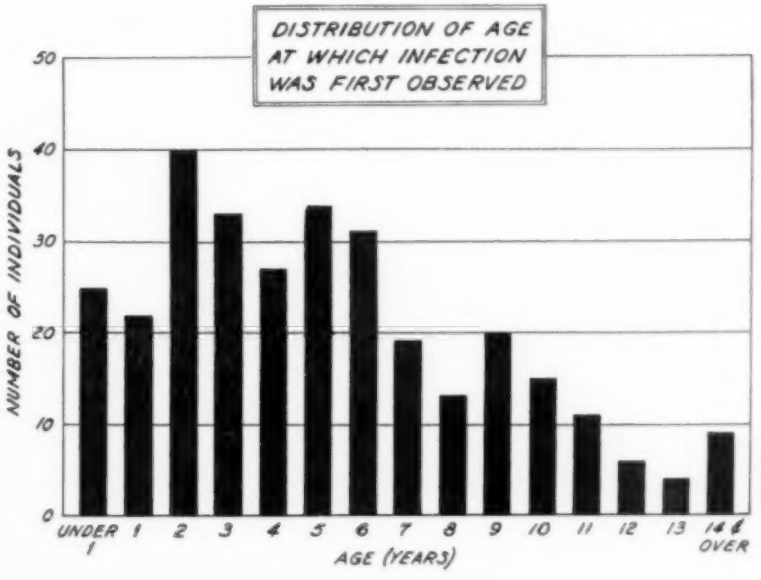

TABLE 2

History of Exposure to Tuberculosis

Group	Total	Sputum Pos.		Sputum Neg.		Sputum Not Recorded (all had tbc.)		No Exposure Known	
		No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
I Pulmonary Tuberculosis	59	23	39	1	1.7	18	30.5	17	28.8
II Mediastinal Tuberculosis	171	98	57	8	4.6	47	26	18	10.5
III Positive Tuberculin Only	82	51	62	5	6.2	21	25	5	6.0
Total	312	172	55	14	4.4	86	27	40	12.5

were finally included in the study. The others were excluded because of inadequate follow-up, poor x-ray films, or lack of coöperation.

The group chosen for study consisted of 312 individuals born between 1912 and 1930, having had a primary tuberculous infection in childhood and followed at least 7 years. There were 193 Negroes and 129 whites. Two hundred and two were females and 110 were males. The present age distribution is shown in Figure 1. The age at which they were first observed to be infected is shown in Figure 2. These persons were drawn from the urban population served by the outpatient department of the Johns Hopkins Hospital. They all had at least one positive tuberculin test—87 per cent of them had had contact with a tuberculous individual, 55 per cent with known sputum positive disease (see Table 2). The reasons for their original hospital visit are summarized in Table 3. Only 21 per cent presented signs or symptoms of illness; the others were seen as contacts of known cases of tuberculosis or had positive tuberculin reactions found on routine examination for some other reason than suspected tuberculosis.

Return to the hospital was secured through the efforts of the clinic's two social workers and a specially appointed public health worker under the direction of the senior social worker, Georgie O. Walker. In order to secure return, many home visits were necessary. The skill and enthusiasm of these workers was largely responsible for the success of the study.

All of the individuals in the study were examined and had x-ray films of the chest at the time of their original visit to the hospital. The majority have been followed routinely at ap-

TABLE 3

Reason for Examination

Group	Tuberculosis Contact		Illness		Total	
	No.	Per cent	No.	Per cent	No.	Per cent
I Pulmonary Tuberculosis	22	37	37	62	59	100
II Mediastinal Tuberculosis	145	78	26	15	171	100
III Positive Tuberculin Only	77	93	5	6.2	82	100
Total	244	78	68	21	312	100

proximately yearly intervals, at least during childhood. All had serial x-ray examinations, some series containing more than fifty films. All had positive tuberculin tests. At the time these individuals were seen as children, 0.1 mg. of old tuberculin was the routine test dose used except in the presence of obvious tuberculosis when 0.01 or less was used. Negative reactors were given 1.0 mg. or more, but positive reactors were not at that time routinely given smaller doses in order to determine their level of hypersensitivity.

In this clinic old tuberculin (supplied by the Gilliland Laboratories) given intradermally, in 0.1 ml. doses of the standard dilutions (1.0, 0.1, 0.01 and 0.001 mg.) has been used throughout the years. The tests are read routinely at 48 hours, occasionally later, up to 72 hours. In order for a test to be considered positive it must show both edema and erythema at least 1 cm. in diameter; reactions of less than this have been considered negative. Control tests have been done only with 0.1 and 1.0 mg. doses unless difficulty in interpretation of smaller test doses has arisen. We have seldom seen false positive reactions to doses of less than 1.0 mg. of tuberculin.

When the individuals chosen for the study reported for examination, they were questioned as to recent tuberculous episodes in themselves or their immediate environment. Only five individuals were known to have had contact with tuberculous individuals within the past five years. They were then examined roentgenologically with a standard postero-anterior 14 x 17 film taken at a distance of 6 feet, and a right buckey film of the mediastinum as this was felt to be the most satisfactory method of demonstrating retrosternal calcium. They were then given intradermal tests with 0.001 and 0.01 mg. of tuberculin unless they were known to be highly sensitive when only 0.001 mg. was given. The tests were read at 48 hours and if negative, 0.1 and 1.0 mg. were injected intradermally which were again read in 48 hours. It was not felt practical to continue giving still larger doses to the negative reactors. Control tests were given with the 1.0 mg. doses and no false positive reactions were encountered. The tests were all administered by the author and were read by the author or by the senior social worker who has had years of experience in this matter. The x-ray films were read by the author with valuable assistance from Dr. John W. Pierson, Head of the X-ray Department, The Johns Hopkins Hospital, and of Dr. Miriam Brailey, Bureau of Tuberculosis, Baltimore. Calcium deposits were not considered present unless the x-ray evidence for their presence was definite, and unless they were visible on at least two successive films of a series. Equivocal shadows were considered negative and the rounded dense shadows at the lung roots cast by large blood vessels were not considered to represent calcified bodies.

The 312 individuals studied were classified into three groups depending upon the x-ray examination of the chest.

Group I consisted of 59 individuals having primary pulmonary tuberculosis and followed for an average of 14.6 years. (The maximum period of follow-up was 20 years in three individuals and the minimum 10 years in four individuals.)

Group II consisted of 171 individuals having primary mediastinal tuberculosis, and followed an average of 12.6 years. (Twenty-two followed 7–10 years, 15 were followed 16 years or longer.)

Group III consisted of 82 individuals having no specific evidence of tuberculous infection on roentgen examination of the chest, followed an average of 12.6 years. (Twelve followed 7–10 years, 7 followed 16 years or longer.)

RESULTS

I. Roentgen Ray Findings (to be published in more detail elsewhere).

Group I: *Primary Pulmonary Tuberculosis*—This group consisted of 59 individuals who, when they first came under observation, had active tuberculous lesions (in two instances there was evidence that the process had already begun to heal). The criteria for inclusion in this group demanded that the roentgen examination of the chest showed—

a. Definite parenchymal infiltration extending beyond the mediastinal nodes and exclusive of primary foci.

b. That these infiltrations were accompanied by enlargement of the mediastinal nodes as seen at some period in the course of the disease.

c. That these infiltrations were not associated with other acute diseases.

These individuals for the most part had lesions considered by this clinic characteristic of primary tuberculous pneumonia. As healing took place calcium deposits became evident by x-ray in 45 instances (76.3 per cent). In the majority of cases this consisted in calcification of the original primary complex; in many the calcium deposits were very extensive. In the other 14 (23.7 per cent) individuals in this group, the tuberculous process healed without calcification becoming visible by x-ray.

In this group were included two individuals who had had the adult, or reinfection type of tuberculosis as a continuation of a severe primary lesion. No evidence of reinfection tuberculosis was found in any other individuals in this group during the study.

Group II: *Primary Mediastinal Tuberculosis*—This group consisted of 171 individuals, 146 of whom had active tuberculosis and 25 of whom had healed lesions when they first came under observation in the clinic. The roentgenographic criteria for inclusion in this group demanded—

a. Definite bulging of the mediastinal lymph nodes, or

b. Definite calcification as seen on serial x-rays.

c. That the process be limited to the lymph nodes and to the primary focus (or foci).

d. That nonspecific root infiltration or fibrosis be excluded.

Healing was accompanied by calcification as seen on x-ray in 155 of the 171 individuals in this group.

In this group no individual was known to have had the adult or reinfection type of tuberculosis prior to this study. However, one instance of adult disease was found during the present survey. This was a minimal, inactive apical lesion found in a colored girl, aged 19 years, who had had only a mild primary lesion which had healed and become calcified many years previously.

Group III—This was the group into which individuals having a positive tuberculin test but no specific roentgenological evidence of tuberculosis were put. There were 82 individuals in the group, of whom 31 had chest films all of which were thought to be completely normal. The other 51 had at some time during the early part of their period of observation nonspecific infiltration or fibrosis at one or both lung roots. In 7 instances these had been diagnosed as mediastinal tuberculosis, but the changes did not appear sufficiently characteristic for inclusion of these individuals in Group II. No individuals in this group developed evidence of re-infection tuberculosis.

II. Tuberculin Tests

Group I: *Primary Pulmonary Tuberculosis*—This group consisted of individuals all having severe tuberculous lesions. Most of them, had they all been tested to doses of tuberculin of less than 0.1 mg., would undoubtedly have been markedly hypersensitive during the active stages of their disease. (Of the 24 individuals tested then with 0.01 mg. or less, 22 gave positive reac-

tions.) When tested during the study with graded doses of tuberculin, it was found that they were still markedly hypersensitive (see Table 4). About 90 per cent of them were positive to 0.01 mg. or less. The remaining individuals with one exception, were positive to 0.1 mg. The one remaining individual gave an equivocal reaction to a whole milligram. This is a white girl, aged 19 years, who had a severe primary lesion and who still had massive areas of calcification in the mediastinum. She gave a positive reaction to 0.1 mg. but did not react to 0.01 mg. during the active stage of her infection. There was no individual in this group who became completely anergic to 1 mg. of tuberculin.

Group II—This group included individuals who had definite x-ray evidence of mediastinal tuberculosis. In some cases the infection was quite severe, in others relatively mild, but in no instance were the lesions as severe as those encountered in the previous group. The greater proportion of these individuals were still markedly hypersensitive to tuberculin. However, there was a slight tendency toward loss of sensitivity as 2 per cent of them became completely anergic to 1 mg. of tuberculin (see Table 4). Of the 8 individuals who were sensitive only to 0.1 mg. or more of tuberculin, all had at some time calcified lesions seen on chest x-ray. Of the 4 individuals who were positive only to 1 mg. or more of tuberculin, 3 had calcified lesions seen on chest x-ray, and of the 4 individuals who had become anergic to 1 mg. of tuberculin, 2 had calcified lesions seen on x-ray—the other 2 did not.

Group III—This group consisted of individuals who had no definite tuberculous lesions in their chest x-ray. They had no other tuberculous lesions which could be identified, with the exception of 3 individuals who developed phlyctenular-kerato-conjunctivitis, and one who subsequently developed an area of intracranial calcification. The individuals in this group (see Table 4) showed a less marked degree of hypersensitivity to tuberculin and a somewhat larger percentage (6 per cent) who became anergic.

TABLE 4

Group I: Primary Pulmonary Tuberculosis
Present Tuberculin Sensitivity

Group	Total No. of Patients	Positive Reaction to 0.001 Mg. No.	%	0.01 Mg. No.	%	0.1 Mg. No.	%	1.0 Mg. No.	%	Negative to 1.0 Mg. No.	%
I Primary Pulm. Tbc.	59	32	54.2	21	35.6	5	8.5	1	1.7	0	0
II Primary Med. Tbc.	171	58	33.9	94	55.0	11	6.4	4	2.3	4	2.3
III No X-ray evidence of Tbc.	82	16	19.5	51	62.2	7	8.5	3	3.7	5	6.1

III. Extrapulmonary Tuberculosis (to be published in greater detail elsewhere).

As was to be expected, the highest instances of extrapulmonary tuberculosis were to be found in Group I, among those having severe primary lesions. Thirty-five (59.3 per cent) of the 59 individuals in this group had extrapulmonary manifestations of tuberculosis. Many of these individuals had more than one such complication, there being in the whole group a total of 67 such complications among the 35 individuals involved (see Table 5). In Group II, only 23 (13.4 per cent) of 171 individuals had extrapulmonary manifestations of tuberculosis. Most of these individuals had only one such manifestation, there being 29 tuber-

TABLE 5

Manifestations of Extrapulmonary Tuberculosis

Group	No. Patients in Group	Patients with Extrapulmonary Tuberculosis		Total Number Manifestations
		Number	Per cent	
I Primary Pulmonary Tuberculosis	59	35	59.3	67
II Mediastinal Tuberculosis	171	23	13.4	29
III Positive Tuberculin Only	82	3	3.6	4

culous complications among the group of 23 persons. In Group III, the instances of extrapulmonary tuberculosis were extremely low. Among the 82 individuals in this group, 3 had phlyctenular-kerato-conjunctivitis, and 1 of the 3 was found subsequently to have developed an area of intra-cranial calcification.

DISCUSSION

At first glance the most striking finding of this study is perhaps the low incidence of the adult or reinfection type of tuberculosis (one instance among 312 individuals). When one considers that adult tuberculosis does not really take its toll before the third decade and that only 102 of the 312 individuals studied were 20 years of age or over, this finding is not remarkable.

The study demonstrates that tuberculin sensitivity in individuals (at least those living in Baltimore) experiencing a primary tuberculous infection during childhood has been remarkably persistent during the period of study. Two explanations for this persistence of hypersensitivity offer themselves. First, that in an urban community such as Baltimore, there is considerable overcrowding and ample opportunity for repeated minimal infections which suffice to keep the hypersensitivity at a high level; or, second, hypersensitivity of more than mild degree once developed is relatively permanent. If the first explanation is valid, then the individuals in all three groups studied should have behaved in the same fashion, but this has not been the case. The individuals in Group I, followed an average of two years longer than those in the other two groups, have shown practically no tendency toward loss of hypersensitivity; those in Group II have shown a less marked degree of hypersensitivity and 2 per cent have become anergic to 1 mg., while those in Group III have shown still less marked sensitivity and 6 per cent have become anergic to 1 mg. of tuberculin.

Furthermore, only 4 of the patients studied have had any known exposure to tuberculosis during the past five years. When one compares the rate of positive tuberculin tests among the groups studied (90 per cent), with the rate in the general population in similar age groups in Baltimore, as exemplified by tests done by Dr. Miriam Brailey in a colored high school in a district where the tuberculosis rate is high, where the average age of the students compared well with our age group, 42 per cent were found to be positive, and with tests done by the Public Health Service on student nurses in Baltimore during their first six months in training where 15 per cent were found to be positive. On this basis one would be justified in assuming that if subclinical infections with tubercle bacilli were an important factor in persistent hypersensitivity to tuberculin, then surely a large number of individuals in this study would have become negative.

The finding of persistence of the tuberculin sensitivity in the great majority of instances over a long period of years following a primary tuberculous infection strongly suggests that while tuberculosis may be the etiological factor in calcified pulmonary lesions in in-

dividuals insensitive to intradermal tuberculin testing, this is a very infrequent occurrence and that some other explanation, possibly histoplasmosis,[5, 6, 26] should be considered more probable.

SUMMARY AND CONCLUSION

1. Three hundred and twelve individuals having a primary tuberculous infection during childhood and followed into young adult life have been studied with regard to persistence of tuberculin sensitivity.

2. Of the 59 individuals who had the more severe tuberculous lesions, 89.9 per cent still showed marked hypersensitivity an average of 14.6 years after their primary infection was first observed. None was anergic to 1 mg. of tuberculin.

3. The 171 individuals who had mediastinal tuberculosis showed for the most part a slightly less marked degree of hypersensitivity, 2 per cent had become anergic to 1 mg. of tuberculin.

4. The 82 individuals having positive tuberculin tests but no specific x-ray evidence of tuberculosis, were found to be for the most part somewhat less hypersensitive to tuberculin than the other two groups, 6 per cent had become anergic to 1 mg. of tuberculin.

5. In only one of the 312 individuals studied was reinfection tuberculosis found to be present years after the healing of the primary infection.

6. Tuberculosis may be the etiological factor in calcified pulmonary lesions in individuals insensitive to intradermal testing with 1.0 mg. of tuberculin, but this occurred infrequently in this study (twice among 230 individuals having definite x-ray evidence of tuberculosis).

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Dallas Health Museum

Conceived and fostered by the Dallas Academy of Medicine, the Dallas Health Museum was opened on October 5 in a large stone structure which formerly housed the exhibit of Texas natural resources on the State Fairgrounds, Dallas. At the time of the opening the State Fair was in full swing. Dr. Oscar M. Marchman, Sr., president of the Academy, stated that the opening was timed to give visitors from all parts of the state "a sample of what can be done to make health visible for the benefit of large groups of people." Bruno Gebhard, M.D., Director of America's first health museum, in Cleveland, was the principal speaker at the opening. The Dallas Health Museum is a project of the Academy. It is incorporated and financed separately from the Academy.

Museum officers are R. L. Thomas, President, Charles R. Moore, Vice President, Marguerite L. Hays, Vice President, Dr. Milford O. Rouse, Secretary, and W. Ray Spears, Treasurer. Dr. Rouse was a principal activating influence in forming both the Academy and the Health Museum, and Mr. Spears, of the Medical Service Society made up of druggists' representatives, is secretary-treasurer of the Academy in addition to his duties with the Museum.

The stated aims of the Dallas Health Museum are to furnish accurate and dependable facts and information on health in line with practices approved by doctors, dentists, pharmacists, nurses, public health officers, hospital personnel, and other scientific sources.

Permanent exhibits at present include duplicates of the Dickinson-Belskie Collection from Cleveland Health Museum and duplicates of several other Cleveland exhibits. Other exhibits are on loan from Cleveland Health Museum. The American Medical Association has loaned many of its exhibits. The movie hall was equipped by the Dallas County Pharmacist's Association for showing of health films. The Mayo Foundation has also added interesting exhibits.

Rodent Control with 1080, ANTU, and Other War-Developed Toxic Agents

JUSTUS C. WARD

Pharmacologist, Wildlife Research Laboratory, U. S. Fish and Wildlife Service, Department of the Interior, Denver, Colo.

RATS have been recognized as disease carriers from an early day, and the primary rôle they play in the spread of bubonic plague, typhus fever, and many less important illnesses is well known. Public health officials and economic rodent control agencies have emphasized the importance of rat control for many years. It has been recognized that construction of rat-proof buildings and the rigid enforcement of adequate sanitation regulations are fundamentals, which must be observed to combat rodent pests effectively. As a supplement to these procedures, however, the reduction of excess rat populations is essential. It is in this phase of rodent control that most spectacular advances have been made during the past few years.

The importance of reductional control was stressed by medical officers of the Armed Forces early in the war, when it became obvious that troops would invade portions of the world where rodent-borne diseases were known to exist. Research work to discover and test new poisons was intensified when early military action by the enemy cut off supplies of red squill, thallium, and strychnine. ANTU and Compound 1080 were two of the most important discoveries. "ANTU," or "Chemical 109," were the code designations of Alphanapthylthiourea, which was the first of the newer agents to be found. ANTU was one of those fortuitous scientific "accidents" caused by the astuteness of a competent observer whose vision enabled him to recognize the value of a chance observation. At the beginning of the ANTU story, Dr. Curt P. Richter of Johns Hopkins University was studying taste psychology in rats, and he noticed that when he used PTC, phenylthiocarbamide, his experimental rats usually died. As PTC had been used safely for several years in studying taste reactions in humans, Dr. Richter was impressed by its apparent toxicity to rats. Feeding trials showed that phenylthiocarbamide was refused by rats, so it became necessary to find a chemical relative which would still be toxic, but would be more palatable. When the potential value of the thiourea compounds was explained to the Committee on Medical Research of the Office of Scientific Research and Development, it was decided that funds should be provided to follow through on the idea. Coöperation was set up between Dr. Richter and the research specialists of E. I. du Pont de Nemours and Company. A large number of substituted thioureas was synthesized, until alphanapthylthiocarbamide—or alphanapthylthiourea, as it is called more commonly—was produced. This substance was found to have the same toxicity to rats as phenylthiocarbamide, and to be much more palatable.

Extensive field trials then were

needed to test the suitability of ANTU for the control of various rodent pests. Arrangements were made with Baltimore health officials, and an extensive rat reductional program was instituted in the city. Simultaneously, the assistance of the Fish and Wildlife Service was requested, and a supply of the new poison was forwarded to Denver. Samples were distributed to workers in various parts of the country. Early reports showed that ANTU was entirely ineffective against California ground squirrels, and was only about one-thirtieth as toxic to black or Alexandrine rats as it was to Norway rats. These observations led to studies which proved that ANTU is highly specific, since it affects Norway rats more readily than it does any other species of animal. It is also more effective against adult than young Norway rats. It causes development of tolerance, since rats which have survived sublethal doses of ANTU are able to withstand subsequent amounts which are many times the acute lethal quantities. In common with many other poisons, it has the characteristic of "educating" rats which have survived small doses, against eating baits containing ANTU again. Unfortunately, it will kill dogs and is toxic in varying degrees to most carnivorous species, while being less dangerous to the herbivorous ones.

When all of these characteristics are given due consideration, the conclusion is reached that ANTU has several idiosyncrasies which must be understood before the substance can be used to best advantage, but that it has promise of becoming a very useful material. It will kill adult Norway rats at 6–8 mg./kg., and accordingly may be used effectively at 1 per cent concentration in bait. ANTU, which is a light grey insoluble powder, may be employed either mixed with ground food; dusted over cut sections of fruits, vegetables, or meats; or mixed with talc and blown into rat burrows or along rat runways. The poison is new, and there are many problems with regard to its adaptability, and to its methods of use, which remain unsolved. Dr. Richter and many of his coöperators are still studying them, however, so it is to be expected that many of these questions will be answered in the near future, and that the true value of ANTU will be demonstrated.

The discovery of Compound 1080 is an illustration of the advantages of wartime coöperation. Prior to the war, strychnine, thallium, red squill, zinc phosphide, arsenic compounds, barium carbonate, and cyanides were readily available, so the earlier search for new agents was of scientific rather than of practical importance. War changed all that, and when shortages of the more effective rodenticides appeared to be imminent, the Wildlife Research Laboratory of the Fish and Wildlife Service undertook a strenuous search for substitute poisons.

When invasion forces encountered rat-borne tsutsugamushi disease, the importance of this project was emphasized and the Office of Scientific Research and Development provided sufficient funds to accelerate this work. Close coöperation was set up with research units of chemical industry, certain army laboratories, and various committees of the OSRD. Several hundred compounds known to possess toxicity in themselves, or to contain molecular configurations suspected of being toxic, were obtained for tests. Finally, Division 9, National Defense Research Committee of the OSRD, sent 10 chemicals to the Fish and Wildlife Service laboratory at the Patuxent Refuge, where preliminary toxicities were being run. One of these ten was given the invoice number "1080."

Stomach tube tests showed that "1080" and one or two others of this batch of chemicals were highly toxic,

so they were forwarded to Denver for further examination. Compound 1080 was found to be the only one of the ten meeting all of the requirements, and, the first of the several hundred chemicals tested, to show evidence of becoming a satisfactory poison.

As the first reports reached the OSRD, it appeared that 1080 might be the new poison which had been sought by Service forces and public health agencies for fighting rodent-borne diseases. The need for haste in testing 1080 was obvious, and the OSRD set up a Rodent Control Subcommittee to expedite that program. To supplement the field testing being done by the staff of the Wildlife Research Laboratory of the U. S. Fish and Wildlife Service, whole-hearted coöperation was obtained of the U. S. Public Health Service, the Surgeon General's Office of the Army, the Bureau of Medicine and Surgery of the Navy, the U.S.A. Typhus Commission, the Chemical Warfare Service, the University of Chicago Toxicity Laboratory, the British Commonwealth Scientific Office, the Texas State Department of Health, the Pan American Sanitary Bureau, and many others. Thus, it was possible to get world-wide studies with 1080 under way.

The results of all of this work have been most revealing. As a poison for the control of certain pests, Compound 1080 has no equal. It is highly effective against all species of rats; it is satisfactory for the control of mice; it gives phenomenal control of prairie dogs, California and other ground squirrels, and gives promise of being useful on other species on which it has not been tested. In short, 1080 is so generally and highly toxic that it is too dangerous for general distribution.

Whereas ANTU is reasonably safe for the inexperienced layman to use, 1080 has been proved to be a tool for only the most expert and careful specialist. To the pharmacologist familiar with strong poisons, the toxicity of 1080 is almost unbelievable. Table 1 illustrates that point.

TABLE 1

Toxicities of Sodium Fluoroacetate (1080)

Animal	*Route of Administration*	*Approximate LD 50%*
Dog	IV *	0.1–0.2 mg./kg.
Coyote	IP Less than	0.2 mg./kg.
Rabbit	IV	0.3 "
Pig	IP	0.3 "
Cat	IP	0.3 "
Calif. ground squirrel	Fed	0.3 "
Black-tailed prairie dog	Fed	0.3 "
Guinea pig	Fed	0.3–0.4 mg./kg.
Field mouse	Fed Less than	0.5 mg./kg.
Bobcat	IP Less than	0.67 "
Goat	IM	0.7 "
Rat (black species)	ST	1.0 "
Rat (Norway)	ST	3.0– 4.0 mg./kg.
Monkey (Rhesus)	IV	5.0– 7.5 "
Monkey (Spider)	IV	10.0–12.0 "
Chicken (Rhode Island Red)	Fed	6.0– 7.0 "
Frog	SC	1000.0–2000.0 "
Horse (British data)	Not given	1.0 mg./kg.

* Experiments at Edgewood Arsenal have indicated that the route of administration has a minor effect on the toxicity of 1080. Consequently, it was considered permissible to compare the results obtained by intravenous injection (IV); stomach tube (ST); intraperitoneal injection (IP); subcutaneous injection (SC); and intramuscular injection (IM); with those determined by feeding.

The comparative toxicities of 1080 to dogs, cats, and rats foreshadows one of the most serious disadvantages of this poison. Because of their greater sensitivity, dogs and cats are killed by eating sick or dead rodents killed by 1080. This means that pets must be removed from areas where this poison is exposed, and must be kept away until all bait and all carcasses have been picked up.

In fact, there is only one advantage appearing on the list of toxicities given above, and that is that primates are less susceptible to 1080 than are most of the lower animals. That makes it possible for us to assume that there is a relative degree of resistance in humans.

The high suceptibility of rodents makes it possible for a very small amount of the poison to be used in bait, and as a consequence, normal baits containing 1080 are not extraordinarily dangerous to humans. In Table 2, the strongest concentration of 1080 recommended in any standard formula is used.

This is the mixture of ½ oz. of 1080 in 1 gallon of water. Rat food baits use 1 gm. of 1080 per lb. (1 oz./28 lb.) and field rodent formulas use only 1 or 2 oz. per 100 lb. of grain. These baits would be less dangerous to man because of the weaker concentration of poison than would be true of the water mix.

It is of interest to compare the relative danger from baits containing several of the common poisons in the concentrations that these are commonly prepared.

In interpreting this table, one important factor must be considered. There is no known antidote for this new poison, and its rapid absorption makes the use of first aid measures effective for only a short time after the poison is swallowed. Much work has been done to find an effective treatment for 1080, and the following suggestions are offered by the Chemical Warfare Service.

TREATMENT IN CASES OF ACCIDENTAL POISONING WITH 1080

Treatment is limited to the use of emetics, and the poison must be eliminated within a few minutes if the absorption of dangerous quantities is to be prevented. Make the patient vomit at once by tickling the throat with the finger, or give ½ teaspoonful of powdered mustard in a cup of warm water. Give a dose of Epsom salts as a purge. Call a physician at once and give him the following information:

For the Physician—Compound 1080 affects the myocardium and the central nervous system. In primates the effect on the heart is the primary cause of death. Pulsus alternans appears first, followed by premature systoles and ventricular fibrillation. The central nervous system reaction is shown by epileptiform convulsions. Following treat-

TABLE 2

Toxicities to Man of Rodent Bait Prepared with Common Poisons

Poison	*Accepted Lethal Dose to Man mg./kg.*		*Concentration Used in Baits*	*Ounces of Bait Containing a Lethal Dose for a 150 lb. Man*
Arsenous acid (As_2O_3)	1.5–15.0	3%	(1 part in 33 parts)	0.12–1.22 oz.
Strychnine	1.0	0.3%	(1 " " 320 ")	0.8 oz.
Sodium fluoroacetate (1080)	5.0	0.4%	(1 " " 256 ")	3.15 "
Thallium sulphate (Tl_2So_4)	20.0	1.5%	(1 " " 65 ")	3.2 "
Zinc phosphide (Zn_3P_2)	40.0	2.0%	(1 " " 50 ")	4.9 "
Barium carbonate ($BaCo_3$)	800.0	20.0%	(1 " " 5 ")	9.9 "
Alphanopthyl thiourea (ANTU)	Unknown	5.0%	(1 " " 20 ")	Probably very large

ment to remove the poison, place the patient at complete rest. Control the CNS excitement by careful use of barbiturates having a moderate duration of action, such as sodium amytal. Little else can be done to arrest the cardiac symptoms.

This summary would be incomplete without reference to two chemicals discovered in Germany during the war. The first of these was *p*-dimethylaminobenzene diazosulfonic acid, sodium salt. This substance was moderately toxic and was reported to be rather effective in the control of rats in Germany. The other was 2-Chloro-4-dimethylamino-6-methylpyrimidine, called "Castrix"—obviously for convenience. This chemical was a great deal more toxic, and was said to be an excellent substitute for thallium. Adequate supplies of these materials have not been made available as yet to workers in the United States, but arrangements have been completed to obtain reasonable lots of both poisons for study. Enough work has been done, however, to justify the belief that neither will be superior to 1080 in efficiency, and that "Castrix," at least, will also be highly dangerous. There is no expectation that either one will be a substitute for 1080, as far as efficiency is concerned, but there is a chance that both may be used more generally with less danger to pets and children.

The conclusion which must be reached from the review of the developments of the past few years is that new discoveries often come in groups. It is no longer fantastic to hope that toxic agents which will be effective only against the rodent pests may be found soon. It is much more logical now to look forward to a world in which man will be able to keep his communities free of rats, than it was before ANTU, 1080, and the other new control agents were discovered. A strong research program in rodent control will continue to be a definite adjunct to permanent improvement in the economic welfare and in the public health, and will be useful in proportion to the degree in which its discoveries are put to use by local and national agencies.

Post-war Control of Flies and Mosquitoes on Public Health Programs

MARK D. HOLLIS AND HERMAN L. FELLTON

Sanitary Engineer Director; and Sanitarian (R), U. S. Public Health Service, Atlanta, Ga.

IT is doubtful if the causes and prevention of insect-borne diseases have ever been better understood or of greater general interest to people in this country, or in any other country, than they are at present. This probably results from the unprecedented publicity given especially to fly- and mosquito-borne diseases during the war years.

During their training periods millions of our young men and women in the armed forces received special instructions on personal protection against arthropod-borne diseases. Many of them encountered these diseases while serving in one or more of the many theaters of war. During the war period, the civilian population received information via the press, radio, and popular literature, as well as from relatives serving with military and naval forces.

The heightened public interest can be organized and directed to demand use of available new and improved materials, equipment, and techniques for insect control. Thus the developments resulting from intensified wartime research can be used to achieve a decade of unparalleled accomplishments in the field of arthropod-borne disease control.

A modernized post-war program of effective insect control will require the coördinated and integrated efforts of individuals as well as governmental and private organizations. The program will involve many professions and skills. Physicians, engineers, entomologists, parasitologists, public health nurses and educators, laboratory technicians, and engineering aides will all have an important part in the program. Continuation and expansion of fundamental research, operational investigations, and well planned, efficiently conducted control projects will be required. There is no reason why wartime achievements cannot be bettered during peactime. We have the tools, the know-how, and the reservoir of trained man power. To reach our goal it is necessary only to coördinate effort and resources.

THE PROBLEM

It is not the intention of the writers to present an exposition of all fly- and mosquito-borne diseases in this paper. A brief review of the more important of these diseases in the United States, however, will serve to delineate the nature of the public health problems involved.

Malaria—Civilian malaria in continental United States has reached an all-time low during the past decade. Reported malaria mortality and morbidity dropped 85 per cent and 70 per cent, respectively. True, a great many malaria carriers have returned to all sections of the country from malarious regions overseas, but adequate precautions have been taken to combat possible outbreaks of this disease in both endemic and nonendemic areas. Of course the principal danger points are in sections of the country where active

transmission of malaria still occurs. Here, concentrated control efforts are being made which may result in more than merely holding the disease in check; they may reduce the infection rate to such an extent that the possibility of malaria eradication in continental United States may be plausible (Hollis, 1946).

Dengue—Outbreaks of this disease occasionally occur in portions of Southern United States. These outbreaks create considerable havoc because of the disabling effects of dengue. Dengue is transmitted by *Aedes aegypti*, a highly domestic mosquito, so control of this disease requires a thorough and painstaking house-to-house inspection program, an intensive educational campaign, and the application of proper control measures.

The Arthropod-borne Encephalitides—In a comprehensive review of the epidemiology of this group of virus diseases, Hammon and Reeves (1945) have indicated the important rôle that mosquitoes play in the transmission of members of this group. Encephalitis virus has been isolated in nature from some of our commonest mosquito species. The danger of the introduction of exotic diseases of this group, such as Japanese B encephalitis and Venezuelan equine encephalomyelitis appears to be quite real. These diseases are much more virulent than our native St. Louis or Western equine types. In the case of Japanese B encephalitis, for example, it has been demonstrated that six species of three genera of California mosquitoes can transmit this virus to animals.

Poliomyelitis—The exact rôle that arthropods play in the epidemiology of this disease is not known. Sufficient evidence is at hand, however, to indicate that insects such as flies may bring about increased dissemination of the virus. Paul, et al. (1941), Sabin and Ward (1941 and 1942), and Trask, et al. (1943), have demonstrated the presence of polio virus in flies trapped in epidemic areas. Ward and his coworkers (1945) have detected polio virus in food exposed to flies in the homes of polio patients within an endemic area.

Gastrointestinal Diseases and Food Poisoning—Because of its habits and body structure, the housefly is peculiarly suited for an important rôle in the transmission of the gastrointestinal diseases, such as typhoid and dysentery. Flies feed readily on the filthiest excreta as well as the daintiest food materials, and pass freely from such matter as human excrement or sputum to clean, appetizingly-prepared food. Their sticky feet, proboscis, and body are excellent mechanical carriers for bacteria and other disease-causing organisms. Their habits of regurgitating droplets and extruding bits of excrement from their digestive system when feeding add to their efficiency as disease vectors.

General Sanitation and Esthetic Considerations—It is recognized that the specific diseases discussed do not comprise all of the mosquito- and fly-borne diseases, even in the United States. But these arthropods, together with ticks, roaches, bedbugs, lice, and possibly others, are important to our welfare for reasons other than disease transmission. From the broader public health aspect, obnoxious insect infestations in our communities should not be tolerated. Good public health depends upon thorough general sanitation. Accordingly, arthropods which are objectionable esthetically as well as those which transmit diseases should be controlled.

THE SOLUTION

The discovery and development of DDT provides a potent weapon in our struggle for improved environmental sanitation. As in other fields of public health, the preventive approach can be

utilized to a great extent. Thus control of arthropod-borne diseases may be accomplished by preventing vector breeding.

The means by which effective control of arthropods of sanitary importance will be achieved are: (1) by proper utilization of DDT; (2) through intelligent use of newly developed hand and power insecticide applying equipment; (3) through well directed and coördinated local, state, and federal programs; (4) by public health education programs; and (5) through continued operational and fundamental investigations designed to improve insect control techniques.

Fly Control—Effective fly control depends upon good general sanitation. Among the measures which serve to eliminate fly breeding places are: (1) proper garbage collection and disposal; (2) elimination of dumps; (3) use of incinerators or sanitary fills; (4) the installation of sanitary privies; and (5) the proper storage and disposal of manure. The use of DDT is no substitute for these practices; it is, instead, an extremely valuable supplementary measure. Where supplemented with good sanitary practices, the number of flies can be reduced usually to a negligible level in milk and food handling establishments by a DDT residual deposit applied to resting surfaces of flies, at the rate of 200 mg. of DDT per sq. ft. (approximately 1 gallon of 5 per cent DDT spray per 1,000 sq. ft.). With poor sanitary practices resulting in a high rate of fly breeding, DDT is much less effective. Nevertheless, DDT is more effective when used alone than other known fly control measures.

In areas with very poor sanitation, breeding places of flies should be treated with a ½ per cent DDT emulsion, solution, or suspension. Such treatments are not very effective against the fly larvae, but the residue kills a high percentage of adults that emerge. Thus complete premise treatment is indicated. Use of effective fly larvicides is necessary, particularly in places where application of DDT to resulting surfaces is not practicable. Orthodichlorobenzene and paradichlorobenzene have been found to be more effective as fly larvicides than DDT. This is particularly true around garbage dumps and in privies.

Locating the actual sources of fly breeding is of considerable importance in combining intelligent sanitary practice with DDT treatment. Close inspection by adequately trained personnel is required. A cursory scouting of a dairy or other establishment often will not reveal the major breeding places. For example, in several dairies fly outbreaks of great proportions resulted from the careless handling of feed. It was scattered about in damp places and produced an ideal breeding medium for flies. In one city, the chief source of fly infestation in a large restaurant was a back alley where flies were breeding between the bricks of the pavement about the garbage cans. Spraying the alley resulted in good control of flies in nearby restaurants. It has been found that a complete residual premise spraying of a dairy in late winter or early spring, before the flies have become active, will result in almost complete eradication of the flies there for the season. This offers great promise in preventing fly breeding.

DDT sprays, mists, and thermol or mechanical aerosols are useful for effecting a rapid reduction in adult fly populations. Such application may be made with hand or power equipment. Hand sprayers fitted with special nozzles, small and large orchard powersprayers, airplanes, or the various thermol and mechanical aerosol generators developed during the war may be utilized for this purpose. This treatment is most effective in open rural areas. Considerable difficulty in achiev-

ing the desired results may be encountered under urban conditions. As a matter of fact, much investigational work remains to be done on the problem of fly control in urban areas.

Mosquito Control — Public health workers have usually placed mosquito control in one of two categories: (1) control of disease-transmitting species, and (2) control of pestiferous species. Recent discoveries concerning the epidemiology of the encephalitides have added a number of so-called pest species to the disease vector category.

Although the measures used against disease vectors and pest mosquitoes are similar fundamentally, programs directed exclusively against the former, such as the Public Health Service malaria and dengue control operations during the present emergency, do involve certain specialized procedures. For example, our continental antimalarial measures have demonstrated clearly the economy and effectiveness of utilizing the "species sanitation" method. This requires the application of entomological science to focus control energies on the specific vectors involved.

It is extremely unlikely that postwar mosquito control operations, whether for the control of disease or for the control of the nuisance mosquito, will be undertaken without adequate entomological guidance. The desirability of eliminating mosquito breeding places by physical corrective measures, where practicable, is well established. Underwater vegetation cutters and herbicides are useful control measures in certain situations. The U. S. Engineers, in collaboration with the Public Health Service, have used underwater cutters with marked success in eliminating the extensive growths of water chestnut from the Potomoc River. This plant growth provided an excellent breeding environment for *Anopheles quadrimaculatus*. Its removal made expensive larvicidal work unnecessary. Newly developed herbicides such as 2-4-D show promise of being a great help in destroying mosquito habitats.

In the near future, control of malaria-mosquito breeding in water impoundments will undoubtedly be done more extensively. Methods used will probably follow established practices. In this work much greater use should be made of mechanical equipment. Trees may be felled in many instances by power saws rather than by hand. Bulldozers and tractors equipped with special rigs, as described by Kiker and Sparkman (1945), may be used for a variety of purposes in connection with reservoir clearance. The latest improved devices for distribution of larvicides by hand, boat, land vehicles, and airplanes may be used to facilitate operations. These measures will result in considerable man-hour economy.

Any present-day discussion of insect control elicits comments on DDT. This material can be used prophylactically as an adulticide and a larvicide. The facts that it is toxic in very minute quantities and that it exerts a prolonged toxic effect when applied properly cannot be overemphasized. The residual adulticidal properties of DDT are being fully exploited in the Extended Malaria Control Program of the Public Health Service. Used as a residual spray in rural houses of endemic areas, DDT is the weapon for a widespread economical campaign against potentially malaria infected mosquitoes. Residual spraying in these houses is a selective action in controlling populations of the malaria vector, resulting in the death of those anophelines which rest on the walls of human habitation. Thus the potentially infective anophelines are destroyed.

DDT, dispersed as mists or aerosols, helps to solve one of the most vexing problems confronting mosquito control workers—the economical control of the

vast broods of flood-water and salt-marsh mosquitoes which periodically infest certain areas. DDT may be dispersed from mist or aerosol generators in airplanes or from those mounted on trucks, jeeps, "weasels," "ducks," or boats. During the two or three day interval that the mosquito broods remain near their breeding places, the highly potent adulticidal properties of DDT will prevent widespread migrations of the mosquitoes over the countryside.

The use of DDT as a mosquito larvicide will reduce application costs at least 70 per cent as compared with cost of other larvicides. Very minute quantities are required for successful work. Progress has been made, but much remains to be done in developing suitable equipment for distributing, over large areas of water surface, the small amounts of DDT required for successful operation.

It should be emphasized that caution must be used in the widespread application of DDT, since many beneficial insects and animals can be killed if it is used indiscriminately.

Education—The control of insects of importance in public health requires coöperation on the part of all individuals in a community. Stimulation of individual self-effort through educational media cannot be overemphasized. Enlightened public sentiment is essential to the success of any public health program. Modern training and educational techniques of demonstrated value should be used in connection with post-war insect control operations. Mention should be made of the fact that commercial pest control operators are adding professional engineers and entomologists to their staffs. Classes are being conducted to educate their personnel in the proper utilization of the newest and most effective techniques of control.

Research—It is anticipated that the investigation of public health insect control problems will be continued by public and private agencies interested in this subject. In Atlanta a center is being developed which is designed to broaden the efforts of the Public Health Service in the field of communicable disease control. This includes the control of the arthropod vectors of diseases. Among other functions, the center will conduct research in the development of equipment, materials, and operating techniques for improving field control measures. Investigations relative to biological and engineering projects will be continued. In these investigations emphasis will continue to be placed on arthropods related to public health. Coöperative control demonstrations with state health departments will be conducted. Technical consultation services and operational assistance in emergencies will be available to states and other agencies.

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MEASURING THE GROWTH OF SCHOOL CHILDREN

THE primary business of children is to grow; and the evaluation of their success in this direction is a primary factor in the program of school health. Measurements of growth may often be of substantial value as a factor in the physician's clinical appraisal of health status. Furthermore, the results of such an appraisal are peculiarly valuable in interpreting to the child and to its parents the values of health, in a positive rather than a negative sense.

It was for this reason that we have asked two of the leading authorities in this field to prepare a special Review Article for this issue of the *Journal*. We are quite aware that the procedures they suggest are far in advance of what could be suggested as standard practice in the schools of the United States. It may be hoped, however, that in the next decade the conduct of school medical services may be raised from the low level which now obtains in many communities. For health officers and school authorities who desire to do a really competent job, this article offers a valuable guidepost as to how the task should be approached.

Drs. Stuart and Meredith are not satisfied with height and weight alone as measures of the growth of children. They consider it important to differentiate the proportionate parts played by development of the skeletal framework, of muscle tissue, and of subcutaneous fat in the growth process. They therefore suggest the addition of four other basic measurements, as follows: the breadth of the pelvic region and the circumference of the chest as criteria of skeletal development; the circumference of the calf as a criterion of muscular development; and a measurement at two selected points of folds of skin as a criterion of subcutaneous fatty tissue. The complete data required can—they believe—be obtained in a period of 8 minutes.

Quite as important as the basic data obtained, is the method employed for their analysis. Our reviewers recognize the great potential values of the Wetzel grid but believe its use should be combined with tabulation by percentile grades. The tables presented by them give data as to values for the first five of the criteria listed above, based on a study of 3,771 Iowa school children, for each 6 months' period from 5 years to 18 years of age. It is pointed out clearly that the results

should be interpreted by taking into account "the position held by each child in each measurement at each examination in relation to the customary ranges of variability for like sex and age."

The arbitrary comparison of a given individual with any assumed norm may be quite misleading. A study made years ago showed that children of pyknic Italian stock who were clinically undernourished showed high weight-height ratios. Another investigation showed that asthenic types in a southern area who were not undernourished showed low weight-height ratios. The comparison of the status of a given individual with the curve of his own previous developmental history is more significant. Even here, however, there are pitfalls. It is well established that within an orderly and normal pattern of growth and development the individual child proceeds at his own rate of speed and with his own proportionate rate of development of various tissue systems. Yet it remains true that marked deviation from a reasonable norm, or marked variation from the individuals' previous developmental chart, always raises a pertinent question. Observed deviations do not establish the existence of malnutrition, for example; but they do offer essential evidence which may indicate the need of more intensive study and which—in combination with other evidence—forms a part of the basis for sound clinical judgment. For such a purpose, Stuart and Meredith have provided a valuable tool.

THE LASKER AWARDS

ONE of the high points of the Cleveland meetings was the first presentation of awards made possible by the generosity of the Albert and Mary Lasker Foundation under the plan announced last spring.[1] These awards are made, either to individuals or to groups, for outstanding achievements in either research or in the administrative application of research in the control of diseases which are recognized as major causes of death. The Committee on Awards under the chairmanship of Dr. George Baehr has made an admirable choice of the first recipients.

It was natural that the year 1946 should present an appropriate occasion for recognizing the outstanding development of coöperative research made by official and semi-official boards and commissions in meeting the emergencies of the war. The five group awards were all in this class.

First were honored the achievements of two such bodies created for the specific purpose of furthering the war effort—the Army Epidemiological Board, and the Board for the Coordination of Malarial Research. The first of these boards made contributions of the first importance to our knowledge of the respiratory infections, prepared vaccines for influenza and Japanese B encephalitis, and discovered the causative agent of infectious hepatitis. The Malarial Board, in addition to its contributions to the general etiology of the disease, made such progress in developing new anti-malarial drugs that a distinguished scientist has recently relegated quinine to the field of medical history.

Next came two long established agencies of the federal government—the National Institute of Health for its researches on a wide variety of epidemiological and nutritional problems—and the Bureau of Entomology and Plant Quar-

antine for the astonishing progress made in developing insecticides and repellents for the control of typhus fever and malaria.

The last of the group awards was made to the Northern Regional Research Laboratory at Peoria for its fundamental advances in the preparation of penicillin which made possible an enormously increased supply of that drug.

It is obvious that these discoveries, which were of such immediate military importance, are no less fundamental for our peacetime program of world health. In a period of years, they may well save more lives than those lost on the battlefield during the conflict.

The second group of five awards were made to individuals, selected with the same felicity displayed in the choice of the groups which were honored.

Fred L. Soper of the International Health Division of the Rockefeller Foundation was cited for his organization of the brilliantly successful campaigns conducted in coöperation with the Brazilian health service for the control of *Aedes aegypti* and *Anopheles gambiae* mosquitoes on the East Coast of Brazil; A. N. Richards of the University of Pennsylvania for the development of the penicillin program and other activities of the Committee on Medical Research of the O.S.R.D.; John F. Mahoney, of the U. S. Public Health Service, for his outstanding leadership in the treatment of syphilis by penicillin and other new procedures; Karl Landsteiner (who died three years ago) and his colleagues, A. S. Wiener and Philip Levine, of the Rockefeller Institute, for their basic researches on the R_h factor; and Carl F. Cori of Washington University for his studies on carbohydrate metabolism and the mutual reactions of hormones in the human body.

The selection of four leaders in physiological chemistry, one epidemiologist and one administrator illustrates the wide scope of the field over which the Award Committee has ranged. The committee this year had the achievements of the World War and of years preceding the war to draw upon. Their successors will not find it easy to maintain the high standards which have been set in 1946.

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1. The Lasker Awards, Editorial, *A.J.P.H.*, 36:658 (June), 1946.

CANCER CONTROL

SOME of the readers of this *Journal* will challenge the boldness of the title of this editorial. It is the belief of the editor, however, that we stand with respect to cancer today much as we stood with regard to tuberculosis forty years ago. We knew then that the individual case of tuberculosis could be arrested by prompt and adequate care; and a few pioneers believed that the organized application of our knowledge could accomplish substantial and far-reaching results in the reduction of the toll of disability and death taken by this disease. Tuberculosis has not been eliminated but it has been controlled. Some of us believe the same end can be measurably approached in the case of cancer.

There has recently been published an important review of actual progress in the development of cancer control activities on a state-wide scale which indicates substantial progress in building administrative machinery for the purposes outlined.[1] Charts are presented for every state in the Union, indicating by a central circle the existence of a state law establishing formally a program for the control of cancer. Next to this circle are three radiating segments indicating

specific cancer control activities of the state department of health, the state medical society, and the American Cancer Society. Finally, an outer series of six segments representing six major essential activities; hospital facilities, clinic facilities, pathologic diagnostic service, lay education, medical education, and statistical research.

The study in question is a pioneer effort and necessarily tentative and incomplete. We have no doubt that certain states will challenge the statements made about them. Yet the general picture is interesting and encouraging. Nineteen states are given credit for all the ten elements in the program as outlined (Alabama, Arkansas, Connecticut, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Massachusetts, New Hampshire, New York, Tennessee, South Carolina, Vermont, Virginia, West Virginia, and Wisconsin). Three others lack only health department leadership (and in one of these, California, the gap has recently been filled). Five other states lack state medical society leadership.

More serious is the finding that 23 states have no organized pathologic service; that 25 states carry on no statistical research; and that 27 states had, at the time of the survey, no state law specifically establishing a cancer program.

Data in regard to the number of general beds in proportion to population for each state are cited from the 1941 A.M.A. study, showing a range from under 200 beds per 100,000 population in 3 states (Arkansas, Kentucky, and Mississippi), to over 500 beds per 100,000 in 6 states (California, Colorado, Massachusetts, Montana, Nevada, and Wyoming). Of special interest are new data with respect to the ratio of state population to known cancer clinics. One such clinic per 50,000 population is considered a practical ideal. Only 2 states (Connecticut and New Hampshire) approximate this standard. In 20 states the ratio falls between 100,000 and 300,000 inhabitants per clinic. In 13 states the ratio is between 400,000 and 600,000. In 10 states it ranges between 800,000 and 2,000,000, and 3 states had no known cancer clinic at the time of the survey.

It would seem that the development of diagnostic services and cancer clinics is the most urgent need for the immediate future. George T. Pack[2] has reported on a series of 1,000 cancer cases with regard to the delay in securing a diagnosis and instituting appropriate treatment. The patient alone was responsible for delay in 44 per cent of the cases; the physician alone, in 17 per cent; while both patient and physician were at fault in 18 per cent. In only 21 per cent was there no serious delay on the part of either. Clearly, the most vigorous efforts to educate both the physician and the patient are urgently desirable.

The American Cancer Society has formulated and is carrying forward a broad and constructive campaign to further these ends. Its Service Program[3] contemplates the establishment and maintenance of facilities by which everyone, regardless of ability to pay, may secure information and diagnostic service with regard to cancer and be referred to a physician or hospital for any necessary treatment. The Society, working through its state and local units has drawn up plans for—

1. Information centers (perhaps one for each 10,000 population) where anyone may go to obtain general information about cancer and find out where to go for a thorough examination.
2. Detection Centers, for early preliminary diagnosis, not involving biopsy or x-ray.
3. Diagnostic and Treatment Clinics (perhaps one for each 50,000 population).

The American Cancer Society, through its national and local organizations, will not operate these facilities but will stimulate their development and assist in their support. The Society works in close coöperation with the U. S. Public Health

Service and the state health officers. The American Medical Association, the American College of Surgeons, and the state and county medical societies have taken—and will increasingly take—a prominent part in the program.

We commend to our American Public Health Association members, particularly health officers, nurses, and health educators, a study of the three original documents to which reference is made below.

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(Part III on state-wide activities, prepared by the Cancer Research Division of the Connecticut State Department of Health.)
2. Pack, G. T. Recent Advances in Cancer Control. *Bull. Pan-Amer. San. Bu.*, 25:303 (Mar.), 1946.
3. *How to Develop a Service Program.* American Cancer Society, 350 Fifth Avenue, New York.

BOOKS AND REPORTS

All reviews are prepared on invitation. Unsolicited reviews cannot be accepted. All books reviewed in these columns may be purchased through the Book Service.

Tuberculosis and Industrial Employment — *Prepared by Oscar A. Sander, M.D. New York: National Tuberculosis Association,* 1946. 16 pp.

This 16 page pamphlet has been issued to provide a guide to industrial physicians in the clinical evaluation and job placement of workers who have been diagnosed tuberculous. The classification of lesions approved years ago by the National Tuberculosis Association is offered for criteria of clinical status. In job placement the physician is advised to distinguish between non-dusty and dusty trades, and, among the latter, to keep in mind especially silica dust exposure trades because of the enhanced hazard they provide for the tuberculous. Adequate medical supervision by x-ray and refined sputum examinations of those accepted for employment are imperative.

Thorough knowledge and experience with tuberculosis and an understanding of the occupational hazards in the plant in relation to tuberculosis are essential. If industrial physicians have this understanding and provide facilities for proper medical follow-up many more persons with tubercular lesions may safely be placed at selected jobs than would be possible otherwise.

JOHN H. KORNS

Folks Do Get Born—*By Marie Campbell. New York: Rinehard,* 1946. 245 pp. Price, $3.00.

Folks Do Get Born is the story of the granny midwives of Georgia. And Georgia's elderly Negro midwives are much like those in other southern states. One of the grannies said to Miss Campbell, "You know and I know—anybody with sense and feelings knows—that to get real acquainted with folks you got to talk with them sociable, and the grannies ain't no exception." Miss Campbell talked "sociable" with many grannies and she listened with a kindly, understanding heart. She lets them speak for themselves in the tales she includes in the second part of the book.

She traveled over the state with the public health nurse-midwives and studied at first hand what public health workers call "the midwife problem." In the first part of the book, Miss Campbell presents the setting in which the granny midwife arose and plays her rôle today—the continuing lack of enough doctors and nurses and hospitals to care for pregnant mothers in most of the rural sections of the state, the granny's dedication of herself to do what she could for the "woman alone in her misery" and to train a successor before the "Lord viewed her to quit," the public health nurse-midwife's recent friendly supervision of the grannies and their response to her instruction and to the state licensing and retiring, the pioneer county's new maternity hospital "for the use of all mothers regardless of their ability or inability to pay" as a better way of looking after "women folks when they birth their babies," and the slow but sure ultimate passing of the granny midwife.

The book is delightfully written, beautifully illustrated with Clare Leighton's woodcuts. It is just the kind of warm, human, accurate record of that American institution — the hereditary granny midwife — that needed to be written. For every nurse, for everyone who lives or works with Negroes—and

that means all of us—there is inspiration as well as information and entertainment in this book.

HAZEL CORBIN

Health Education in Rural Schools and Communities—*By Nina B. Lamkin. New York: Barnes,* 1946. 209 pp. Price, $2.50.

Health education in rural areas has been a highly neglected field of endeavor. It is therefore gratifying to take up a book which has grown out of and is geared to rural health problems. Miss Lamkin has drawn upon her long and varied experiences with rural people in the Middle West and Southwest to produce a book which embodies the simple but sound philosophy that health education should be a coöperative adventure in which all members of a community work together on practical problems of healthful living.

The book is intended primarily as a guide for school administrators and teachers in rural communities. It is divided into five parts as follows: Part I, Health Problems in Rural Areas; Part II, Helping Children in Rural Areas to Understand and Practice Healthful Living; Part III, Helping Children to Understand Life — The Rural High School—Community Cooperation on Community Problems; Part IV, The Teacher's Health and Preparation; Part V, Additional Helps.

The strength of the book lies in its many practical suggestions for making health a reality in the lives of rural people, especially rural children, and in its stress upon the importance of community health leadership by school personnel. Miss Lamkin is at her best in Parts II and III. In Part II, common rural health problems are taken up one at a time, and for each problem there is a brief discussion of it as it reveals itself in the rural setting, suggestions for discussion and for planning together, and lists of coöperative activities reported by teachers in rural areas. Part III contains a suggested outline for a course in personal health and human relations in the secondary school.

Throughout the book community health resources, including public health department personnel and facilities, are made known. A case is built up for community health councils to plan and act on school and community health problems.

The book is written in a very readable style and should serve as a useful source of ideas for school administrators, teachers, and public health nurses working in rural areas.

RUTH E. GROUT

Lectures on Preventive Medicine—*By Harvey Sutton, O.B.E., M.D., D.P.H. Sydney: Consolidated Press, Ltd.,* 1944. 658 pp. Price, 27/6.

The Director of the School of Public Health and Tropical Medicine of the University of Sydney has brought together Australian facts and experience for the benefit of medical students. Clearly presented in logical arrangement, the contents deal with human life history, environment, communicable diseases, and public health administration.

Teachers of preventive medicine and of public health, who will desire to have a copy of this instructive volume for reference purposes, will note with interest that the course for fifth year medical students "is able to work on a considerable basis of scientific and clinical preparation" because preventive aspects permeate the work of the student, notably in physiology, bacteriology, and obstetrics. "The aim of the course is to introduce the student to the world in which his labours will be set, to present to him the larger problems of social life and health with which he will be faced, and to suggest ways in which the practitioner is so often able to help his patients and to contribute in some measure to the welfare of his

generation. To do this well implies some knowledge of the background of public health organization, and of the campaigns for health in which the practising doctor is a front-line unit."

IRA V. HISCOCK

Milk Marketing Under Federal Control—*By Carl McFarland. New York: Milk Industry Foundation,* 1946. 205 pp. Price, $7.50.

Sanitary control of milk has been a legitimate subject for government regulation for nearly a century. Economic control of the dairy industry by government is, however, of more recent origin. In 1933 Congress passed the Agricultural Adjustment Act, which was amended in 1935, and promptly thereafter declared unconstitutional, in part, by the United States Supreme Court. In 1937 Congress adopted the Agricultural Marketing Agreement Act, which was amended in 1940, and has been upheld by the federal courts in a number of notable decisions.

This authoritative book, prepared by a former Assistant Attorney General of the United States, describes in detail the background, content, administration, and operation of this important statute. Not only does it give the substance of the Act, but also the intricate rules of practice and procedure which are now such an inevitable feature of federal administrative law.

The book is well documented, and has a number of useful appendices, showing among other matters the legislative history of the law, and the marketing orders in various jurisdictions. There is a good index.

Although designed primarily for members of the milk industry, the book should also be of interest and value to official milk inspectors and all others who are concerned with the regulation and control of milk, a food now recognized as being acutely affected with a public interest. JAMES A. TOBEY

Summary Report (Pacific War)—*By U. S. Strategic Bombing Survey. Washington: Gov. Ptg. Office,* 1946. 32 pp.

Here is a short, concise report on the strategy of the Japanese in the War of the Pacific and the way we were able to circumvent them in their aims. In addition to its brevity it is authentic and written in an impartial vein. It outlines briefly the steps of the Japanese in their offensive and the defensive measures we took, with the final decisive offensive steps that culminated in our victory. Two maps illustrate the report.

Of particular interest to public health workers are the two pages given to a consideration of health and morale of the Japanese civilian population under assault and a description of the effects of the atomic bomb.

FRANCIS B. ELDER

Modern Development of Chemotherapy—*By E. Havinga, H. W. Julius, H. Veldstra, and K. C. Winkler. New York: Elsevier Publishing Company,* 1946. 175 pp. Price, $3.50.

An important series of monographs on the progress of research in Holland during the war is being issued under the editorial direction of R. Houwing of Delft, and J. A. A. Ketelaar of Amsterdam. These monographs, released on VE Day, report the secret research intensively carried on in Holland under the oppressive burden of the Nazi occupation. Several monographs will deal with medical subjects, including one on nutrition by B. C. T. Jansen, another on sex hormones by S. E. deJongh and J. H. Gaarenstroon, and one on embryology by M. W. Woerdeman and C. P. Raven. It is a remarkable example of scientific fortitude which our Dutch colleagues have given us in carrying forward so much significant work in the face of Nazi oppression.

This volume on the development of chemotherapy in Holland during the war has been summarized from the chemical standpoint by Havinga and Veldstra, while pharmacological and clinical studies are summarized by Julius and Winkler. Julius, Winkler, and their associates report much interesting work on the mechanism of action of sulfonamides, with particular reference to antagonists and activators. Veldstra, Havinga, and their associates report ultra-violet absorption spectra on a number of sulfa compounds. It is proposed that *p*-aminobenzoic acid reacts with nucleoproteins. It is inferred that sulfa compounds interfere with the mechanism of division of microörganisms rather than with the mechanism of growth. Many interesting sulfa derivatives were investigated from the standpoint of influence on enzymes.

While most of the volume is concerned with sulfa compounds, there is a short chapter by J. J. D. deWit on antibiotics. The Dutch work began from the observations of van Luijk in 1938 when he showed the possible importance of metabolic products of microörganisms in medical therapeutics. He obtained an antibiotic factor from *Penicillium expansum*, which is thermostable and capable of extraction. The active agent is called "expansine." It is believed to be identical with "clavicine" which was isolated by the English. It has been used clinically in treating fungus diseases.

It is clear from the work summarized in this small volume that Dutch chemotherapists have remained active under the most trying circumstances. With restoration of desired scientific intercourse, great stimulus should be afforded for rapid developments of chemotherapy in the Netherlands.

CHAUNCEY D. LEAKE

The Prevention of Communicable Diseases. Pupil's Guide Book—*By Division of Health and Physical Education, Department of Education, Baltimore, Md.*, 1946. 37 pp. (mimeographed).

Pupil study guides are always a useful adjunct to any school health instruction program. When these guide books contain problems for consideration which bear directly on the students' daily living needs and experiences they are doubly effective.

This junior high school unit was prepared by a group of teachers under the general supervision of Dr. Lillian B. Davis, Health Education Consultant in the Baltimore school system. Ten problems related to communicable disease control are taken up in logical order. For each problem, background information, practical study questions, and suggestive activities are skillfully interwoven. Young people using the guide should succeed in developing a sound understanding of everyday measures for disease prevention and control.

RUTH E. GROUT

A Bibliography of Infantile Paralysis—1789–1944—*Prepared under the direction of The National Foundation for Infantile Paralysis. Philadelphia: Lippincott*, 1946. 672 pp. Price, $15.00.

This unusual volume, dedicated to Franklin Delano Roosevelt, sponsored by Basil O'Connor, edited by Morris Fishbein, and compiled by Ludwig Hektoen and Ella M. Salmonsen, is an index of 8,320 articles published on infantile paralysis, from Underwood's "Debility of the Lower Extremities" in 1789, to the end of 1944.

The numbered articles are quadruplically indexed in their listing in the body of the book alphabetically, by years, with added indices by author and by subject.

A large proportion of the articles indexed are followed by abstracts which are, in view of the magnitude of such an

undertaking, astonishingly accurate and adequate. For a compilation of this sort errors are surprisingly few.

Only one possible improvement comes to mind—if there had been any way of doing it. If the references could have been one, two, or three starred, the investigator would have had a Baedeker for his travels in the realm of research. Certainly with this volume investigators will be able to take better aim in their work.

The book is intended primarily for the student of the disease, but its chronological arrangement with the abstracts constitutes "the story of infantile paralysis."

W. LLOYD AYCOCK

Marine Microbiology—*By Claude E. Zobell, Ph.D. Waltham, Mass.: Chronica Botanica Co.*, 1946. 240 pp. Price, $5.00.

A comprehensive critical review of knowledge of aquatic bacteria, chiefly marine, and of their rôles in: transformation of organic matter; precipitation of calcium, iron, manganese, sulphur; the possible formation of petroleum; and interrelationship with other aquatic flora and with the fauna. The abundance of bacteria in bottom deposits, the long-time changes induced therein, and bacterial activities in the nitrogen and phosphorus cycles are emphasized. Of chief interest to sanitarians are the chapters on: Collection of marine water and mud samples; methods for enumerating marine bacteria; factors influencing their distribution in the sea; sanitary aspects of marine microbiology; and economic importance of marine microörganisms. Stress is laid on avoidance of metal sampling equipment; necessity for quick cooling of plates after inoculation, since many marine bacteria are killed by 10 minutes at 30° C. The media are highly specific, even the best medium revealing about one-tenth of the bacteria present. These bacteria cause liquefaction of chitin, discoloration of boiled lobster and salt fish, destruction of cordage, nets, corks, and are the chief cause of spoilage of fish, with deterioration even below —5° C. Fresh seawater is bactericidal in cultures and in open sea, coliform bacteria rarely extending beyond a mile from sewer outfall into sea. The book contains 22 pages of useful bibliography and is broad in outlook, covering aspects of geology, marine ecology, and oceanography, in addition to an introduction to the new and highly promising field of hydrobacteriology. T. C. NELSON

Modern Management in Clinical Medicine—*By Frederick K. Albrecht, M.D. Baltimore: Williams & Wilkins*, 1946. 1238 pp. Price, $10.00.

The purpose of this volume "is to present . . . a clear picture of the rationale of therapy together with useful and usable information, in detail, about the technique of therapy." On the whole, this has been done effectively. The rationale of treatment is based on very broad considerations of the etiology, pathology, and physiology of the diseases discussed. Diagnosis is also covered, quite thoroughly in most instances. Very detailed suggestions on history-taking are made, both for the general medical history and for several specific diseases and organ systems. An extremely broad range of diseases is considered, including "tropical" diseases as well as those commonly encountered in North America. There are suggestions for immediate action, further diagnostic investigation, and sources of additional information for almost any tentative diagnosis one might make, and for a great many conditions detailed methods of treatment are given.

One feels much sympathy for the author in his efforts to get the latest information on a wide variety of sub-

jects through all the processes of publication before newer ideas superceded them. He has done this well enough so that one can be charitable with the occasional evidences of haste and incomplete evaluation.

There are many points with which specialists may take issue—errors of emphasis, incomplete descriptions, some specific methods of therapy. The discussion of food poisoning and its treatment is an example. The best references have not been given in all cases. The use of trade names, while often helpful, leads at least once to an unfortunate outcome (Neoprontosil for amebiasis). Frequent misspellings are an annoyance. It would have been helpful to outline in one place a method of approach to the solution of the problem of fever without localizing signs or symptoms. For the public health worker who seeks a handy reference with which to refresh his knowledge when questions of clinical management arise, this should be a useful volume. There is much new information in it, organized so it can be found easily. RODNEY R. BEARD

Fee and Fee Bills: Some Economic Aspects of Medical Practice in 19th Century America—*By George Rosen, M.D. Baltimore: Johns Hopkins Press*, 1946. 93 pp. Price, $1.50.

This monograph provides a good reference background for those wishing to study the evolution of medical fees in this country. Although the evidence from fee bills may not portray the actual charges made by physicians in individual practice, it probably does constitute a reliable basis for establishing trends and making comparisons between various sections of the country.

It is particularly interesting to note from the earliest opinions of the medical profession reported by the author and recurring throughout the period covered by his study, that there appears to have been concern with the problems of the "sliding scale" and of the credit system. Evidently repeated efforts on the part of the profession for over a century to control the former and to eliminate the economic hardship to the doctor of the latter have been largely unavailing.

EDWARD S. ROGERS

Psychiatry for Social Workers—*By Lawson G. Lowrey, M.D. New York: Columbia University Press*, 1946. 336 pp. Price, $3.50.

The well trained public health nurse has a knowledge of mental ills and maladjustments. She recognizes symptoms and observes their effect on family life, but she does not always know when psychiatric care is imperative. Many points as to what the rôle of the nurse, as well as the social worker, should be in the care of these patients are clarified by Dr. Lowrey's book. The author assumes that the reader has knowledge of mental maladjustment and mental illness, mental defect and convulsive disorders. With this assumption he explains the meaning that deviations in mental functioning may have for those who work for the health and welfare of such patients and their families. He covers such practical points as which symptoms may be indicative of serious consequences unless psychiatric care is obtained, what can be done to help certain patients maintain the level of adjustment they may have achieved as the result of treatment, the kind of work patients suffering from convulsive disorders may safely undertake, and various implications of neurotic manifestations. The chapters on the Neuroses and the Behavior Disorders will be of particular interest to public health nurses because they encounter such patients so frequently in their daily work.

The author is conservative in his

evaluation of the various kinds of psychiatric treatment, pointing out its limitations with certain types of cases, as well as the encouraging results with other types. The material contained in this book will give the social worker certain assurance both in understanding and working with patients who show some mental deviation. It will also help her to accept limitations as to what can be done for patients with serious mental ills. When a more comfortable and satisfactory level of adjustment can be achieved, resources to further this end are suggested. The responsibility the social worker should assume in the treatment of these patients is clearly indicated. Since the aim of the book is to increase the social worker's diagnostic acumen rather than to give method and procedure, it will be a useful source of reference for nurses, as well as social workers who are working with individuals to promote their health and welfare.

HESTER B. CRUTCHER

Research and Regional Welfare—*Edited by Robert E. Coker. Chapel Hill, N. C.: University of North Carolina Press,* 1946. 229 pp. Price, $3.00.

This publication is a compilation of papers presented at a conference on regional research held at the University of North Carolina. The papers cover a broad range—the humanities and social science, nutrition and public health, industry, agriculture, and fisheries. Each paper gives recent research data within the subject covered, and each emphasizes the need for additional research in every phase of living in the Southeast.

The addresses assembled represent distinguished leaders from the Far West, the Middle States, the Northeastern and the Southeastern Regions. The need for research as a necessary step to regional and national planning for the more abundant type of daily living is stressed throughout.

Public health workers, especially of the Southeast, will find the two papers on public health and nutrition of interest. Research in Nutrition, is presented by Dr. Russell M. Wilder of the Mayo Foundation for Medical Research. Dr. Wilder points to the South as a valuable contributor to research in modern medicine. "The triumphant march in modern medicine, with impending conquest of plagues such as typhoid fever, hookworm, malaria, and amebic dysentery, has been nowhere more dramatic than in these southern states. Nor have state and county health departments anywhere been better organized, or manned by more faithful servants. Millions of persons today owe their lives to the vision and devotion of those who made possible these triumphs."

Dr. Wilder's paper presents the dramatic story of the discovery of the cause of pellagra, its treatment and prevention. He then indicates a way to better nutrition through research to improve the quality of foods, especially by means of breeding improved varieties of the more commonly used foods. Seed, soil, and climate are important factors in a higher nutritional content through breeding. Loss of nutritional values in the kitchen is indicated. Poor nutrition plays a part in the etiology of such diseases as tuberculosis and malaria.

There is included a paper on Medical Research—The Foundation for Future Progress in Health and Public Welfare, presented by James Stevens Simmons, Brigadier General, Office of the Surgeon General.

REBA F. HARRIS

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Back to Normal—Except in those states which enforce anti-fireworks laws, the first post-war glorious fourth produced its usual grisly crop of the maimed and the blinded.

ANON. Sixth Annual Summary of Fourth of July Injuries. J.A.M.A. 132, 8:442 (Oct. 26), 1946.

Ergo Propter Hoc—In a North Jersey epidemic it was found that over half the poliomyelitis patients had carious teeth with pulp exposed, whereas in a similar group of well persons less than a quarter had like exposure of pulp. In populations where fluorine in the drinking water results in a lowered incidence of caries there was found also a lower incidence of polio than in comparable communities lacking fluorine in drinking water. There, friends, are a couple of two's and two's put together at your own peril.

AISENBERG, M. S. Further Studies of Exposed Pulps as Portal of Entry for Poliomyelitis Virus. J. Am. Dent. A. 33, 17:1109 (Sept. 1), 1946.

Syphilis Treatment Schedules—You will be encouraged by this progress report on the modern treatment of syphilis. Gradually, experience is piling up to the point at which definite schedules may be set. Apparently the percentage of cures is increased if a few doses of bismuth are added to the penicillin regimen. Periodic check-ups are going to be needed in the future as much as in the past.

HELLER, J. R., JR. Results of Rapid Treatment of Early Syphilis. J.A.M.A. 132, 5:258 (Oct. 5), 1946.

Gleaned from a Large Pneumonia Epidemic—Despite advances in treatment, pneumococcal pneumonia remains an important cause of death. Two factors influencing the pneumonia rate are the non-bacterial respiratory disease rate and the pneumococcus carrier rate. About both factors there is something to be done.

HODGES, R. G., *et al.* Epidemic Pneumococcal Pneumonia (Five Papers). Am. J. Hyg. 44, 2:183 (Sept.), 1946.

Where TB Mortality Is Lowest—From Denmark comes this, "The general principle is now to advise all tuberculin-negative individuals over 7 or 8 years to submit to BCG vaccination." "BCG vaccination has been appreciated by the population." When, do you suppose, will we begin to protect those members of our professions who are most frequently exposed?

HOLM, J. Tuberculosis Control in Denmark. Pub. Health Rep. 61, 40:1426 (Oct. 4), 1946.

Outstanding Sanitary Achievement—How M.I.T. went about providing the best possible wartime dining service for the 2,100 military trainees. Staffs were instructed, examined, and supervised; foods sampled and tested; the best of equipment installed and sanitated.

HORWOOD, M. P. A Demonstration in Food and Utensil Sanitation at M.I.T. The Sanitarian. 9, 1:5 (July-Aug.), 1946.

Medical Services for Small Industries—"The standard of one hour (of medical attendance) per week per hundred employees is not adequate . . . in most small plants; two hours per week per hundred appears necessary." Health workers generally may find some use for this Canadian figure, passed on for whatever it may be worth to you below the border. "A plant with 400–500 em-

ployees justifies the employment of a full-time nurse," is another opinion for your record.

JONES, F. M. Supervision of Health in Small Plants. Canad. Pub. Health J. 37, 9:345 (Sept.), 1946.

Pre-Horse-and-Buggy—This writer lumps together dog catchers, justices-of-the-peace, poormasters, part-time health officers, and other anachronistic office holders, all of whom might better be transferred to more productive and rewarding work. Nothing short of full-time trained public health administration will ever do.

LUGINBUHL, M. Out of Local Governmental Chaos. Survey Midmonthly. 82, 10: 251 (Oct.), 1946.

Compulsion Appears to Be the Answer: He Says—In one British city, routine Wassermanns taken on all prenatal cases revealed 201 strongly positive reactors. As a result, 176 expectant mothers were referred to local V.D. clinics. All made one visit each, but only 37 persisted to receive minimum treatment. I wonder if American cities can make a better follow-up showing of our legally required prenatal blood tests.

MACFARLANE, W. V. Syphilis in Pregnancy: Preliminary Report on a Tyneside Investigation. Pub. Health. 59, 12:181 (Sept.), 1946.

Hang Together?—To meet changing needs, the nurses consider plans to develop standards of preparation and practice, to promote the welfare of nurses, and to make nursing services economically available to meet health needs. This forward-looking step may have suggestions for the rest of us.

RAYMOND RICH ASSOCIATES. Report on the Structure of Organized Nursing. Am. J. Nurs. 46, 10:648 (Oct.), 1946. (Condensed version) Pub. Health Nurs. 38, 10:523 (Oct.), 1946.

Day-to-Day Deviations — When does an epidemic become an epidemic? Not until the incidence flares up above normal-for-the-season levels. The use of an industrial "control chart" method is suggested as a way to keep an eye on bad actors.

RICH, W. H., and TERRY, M. C. The Industrial "Control Chart" Applied to the Study of Epidemics. Pub. Health Rep. 61, 42:1501 (Oct. 18), 1946.

A Start Is Made — Throughout Maryland the State Health Department is providing care for the medically indigent through the services of physicians, dentists, laboratory technicians, and nurses as a new venture in public health.

RILEY, R. H. Medical Care in Maryland. J.A.M.A. 132, 6:326 (Oct. 12), 1946.

Rabies, Poliomyelitis, *et al.*—A round dozen of nervous diseases of viral origin plus others of unknown etiology comprise the ambitious field of this paper, a purpose of which is to urge more frequent use of virus laboratories.

RIVERS, T. M. Virus Diseases of the Nervous System. J.A.M.A. 132, 8:427 (Oct. 26), 1946.

In Mice But Not in Men—Human volunteers vaccinated with bacillary dysentery vaccine showed no significant immunity against experimental infection (mice did), but sulfadiazine controlled the disease and suppressed the carrier state.

SHAUGHNESSY, H. J., *et al.* Experimental Human Bacillary Dysentery. J.A.M.A. 132, 7:362 (Oct. 19), 1946.

Family and Population Policies—You may think this a peculiar place for a review of a book review. I include it here because the reviewer begins by dubbing the book "one of the most important single volumes on the population problem since Malthus." Concerned as you are with population problems, perhaps you had better hunt up the book, if it is that important. As a population policy "must" the author

lists nine reforms, any one of which is guaranteed to make our professional individualists see red.

STALLYBRASS, C. O. "Nation and Family" by Alva Myrdal. M. Officer. 76, 12:127 (Sept. 21), 1946.

Pot Pourri—If you want to know what our British colleagues talk about when they meet, you'll find a variety of papers on such diverse topics as rheumatic fever and prefabricated housing, nurseries and the control of bovine tuberculosis, nutritive value of foods and town planning, the future of pediatrics and slum clearance, traffic problems and the health visitor. You'll love the polite blarney of the discussants: a quaint custom which we ignore so manfully over here. Altogether there are 200-odd pages of text.

RIGHT HON. LORD WOOLTON, P.C., C.H., D.L., *et al.* Health Congress at Blackpool. J. Roy. San. Inst. 66, 4:269 (Aug.), 1946.

BOOKS RECEIVED

Listing in this column acknowledges the receipt of books and our appreciation to the senders. Space and the interests of readers will permit review of some, but not all, of the books listed.

AMINO ACID ANALYSIS OF PROTEINS (Annals of the New York Academy of Sciences, Vol. XLVII, Art. 2, pp. 57–240). By William H. Stein, *et al.* New York: New York Academy of Sciences, 1946.

ANTIBIOTICS—Parts I and II (Annals of the New York Academy of Sciences, Vol. XLVIII, Art. 2, pp. 31–218). By Werner W. Duemling, *et al.* New York: New York Academy of Sciences, September, 1946.

BLIND AND PARTIALLY SEEING CHILDREN IN ILLINOIS. Chicago: Illinois Commission for Handicapped Children, 1945. 63 pp.

CANCER CAN BE CURED. By Alfred J. Cantor, M.D. New York: Didier, Publishers, 1946. 175 pp. Price, $2.50.

THE CENTENNIAL OF SURGICAL ANESTHESIA. By John F. Fulton and Madeline E. Stanton. New York: Henry Schuman, 1946. 102 pp. Price, $4.00.

THE CHEMICAL SENSES. By R. W. Moncrieff. New York: Wiley, 1946. 424 pp. Price, $4.50.

THE CONTROL OF ATOMIC ENERGY. United Nations Department of Public Information. New York Columbia Univ. Press, 1946. 42 pp. Price, $.25.

THE DAY CARE OF LITTLE CHILDREN IN A BIG CITY. By Leona Baumgartner, M.D., *et al.* New York: Child Welfare League of America, 1946. 33 pp. Price, $.50.

DAYTIME CARE—A PARTNERSHIP OF THREE PROFESSIONS. New York: Child Welfare League of America, 1946. 31 pp. Price, $.35.

THE DISPOSAL OF SYNTHETIC AMMONIA PLANTS. War Assets Administration. Washington: U. S. Gov. Ptg. Office, 1946. 10 pp.

THE EFFECTS OF ALIPHATIC NITROUS AND NITRIC ACID ESTERS ON THE PHYSIOLOGICAL FUNCTIONS WITH SPECIAL REFERENCE TO THEIR CHEMICAL CONSTITUTION (Bulletin No. 186, National Institute of Health). By W. F. von Oettingen. Washington: U. S. Gov. Ptg. Office, 1946. 76 pp. Price, $.15.

ESSENTIALS OF MEDICINE. (15th ed.) By Charles Phillips Emerson, Jr., M.D., and Jane Elizabeth Taylor, R.N. Philadelphia: Lippincott, 1946. 688 pp. Price, $3.50.

FIVE MILLION PATIENTS. By Allen W. Freeman, M.D. New York: Scribners, 1946. 299 pp. Price, $3.00.

FOOD VALUES OF PORTIONS COMMONLY USED. (6th ed.) By Anna dePlanter Bowes and Charles F. Church, M.D. Philadelphia: College Offset Press, 1946. 58 pp. Price, $1.50.

GREENWICH (Conn.) COMMUNITY PROGRAM. Greenwich Nutrition Committee. Greenwich: Greenwich Tuberculosis and Health Association, 1946. 124 pp.

HEALTH INSTRUCTION YEARBOOK, 1946. By Oliver E. Byrd. Stanford, Calif: Stanford University Press, 1946. 399 pp. Price, $3.00.

ASSOCIATION NEWS

OFFICERS, 1946–1947

President, Harry S. Mustard, M.D., New York, N. Y.
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HARRY STOLL MUSTARD, M.D.
PRESIDENT OF THE AMERICAN PUBLIC HEALTH ASSOCIATION

The Governing Council at the 74th Annual Meeting unanimously elected Harry Stoll Mustard, M.D., of New York City, President of the American Public Health Association for the term ending with the close of the 75th Annual Meeting of the Association in September, 1947. Dr. Mustard replaces the late Milton J. Rosenau, M.D., who died in April, 1946, while President-Elect.

Harry Stoll Mustard

Dr. Mustard is a native of Charleston, S. C., where he was born October 10, 1888. After completing preliminary training at the College of Charleston, he received his M.D. from the Medical College of South Carolina, where he later served in clinical pathology and in the Department of Medicine. After four years of service as scientific assistant in the United States Public Health Service, he became Health Officer of Preston County, West Virginia, in 1923, and in the following year Director of the Child Health Demonstration in Rutherford County, Tennessee, where he served from 1924 to 1928. From 1929 to 1932 he served as Assistant Commissioner with the Tennessee State De-

partment of Health, and in the latter year became Associate Professor of Public Health Administration in The Johns Hopkins University School of Hygiene and Public Health, Baltimore, where he spent five years. From 1937 to 1940 he was Hermann M. Biggs Professor of Preventive Medicine at New York University College of Medicine. Since 1940 he has been identified with Columbia University and is at present Director and Professor of Public Health Practice in the School of Public Health. Dr. Mustard has served as visiting lecturer at Vanderbilt University, University of Kentucky, and the University of Pennsylvania. He has served as a member of the Board of Scientific Directors of the Rockefeller Foundation, a member of the Commonwealth Fund Committee on Health Activities and, since 1944, has been a member of the National Advisory Health Council of the United States Public Health Service. He is a Fellow of the New York Academy of Medicine.

Dr. Mustard's identification with the American Public Health Association began in 1923, and he was elected to Fellowship in 1927. He has served two terms as elective councilor on the Governing Council, 1936–1942, and in 1940 became a member of the Executive Board. During the years 1941, 1942, and 1943 he served as Editor of the *American Journal of Public Health*, resigning in March, 1944, because of the pressure of other duties.

As an author Dr. Mustard is well known for his volumes *Cross Sections of Rural Health Progress*, 1930; *An Introduction to Public Health*, 1935, 2nd edition 1944, *Rural Health Practice*, 1936, and *Government in Public Health*, 1945.

Sedgwick Memorial Medal for 1946 Awarded to Dr. Karl F. Meyer

THE award of the Sedgwick Memorial Medal for 1946 was made on November 12 during the Seventy-fourth Annual Meeting of the American Public Health Association in Cleveland, Ohio, by Dr. C.-E. A. Winslow, Professor Emeritus of Public Health, Yale School of Medicine, and Editor, *American Journal of Public Health*, who is Chairman of the Sedgwick Memorial Medal Committee. In presenting the medal, Dr. Winslow said:

"It is my privilege to present tonight, on your behalf, the William T. Sedgwick Memorial Medal to the sixteenth recipient of this distinguished award. This recipient possesses one qualification possessed by none of his predecessors. He comes from California. No previous award has penetrated further than to the eastern city of Chicago.

"Perhaps in the past we have been like the lady from Boston who on undertaking a trip to the Pacific Coast was asked what route she was taking. 'I am not quite sure,' she replied; 'but I think we are going by way of West Newton.' Tonight, however, we emulate the hostess of Los Angeles who on displaying the magnificent view from Palos Verdes heights pointed out that 'This is the Pacific Ocean, the largest ocean in California.' Dr. Meyer is the Pacific Ocean of public health in California.

"He has travelled far—both geographically and intellectually—to reach his present eminence. Dr. Meyer was

born in Basel, Switzerland, in 1884, and took the degree of Doctor of Veterinary Medicine at Zurich in 1909 (and his Ph.D. at the same university in 1924). His Alma Mater—like the College of Medical Evangelists in his new home state—conferred upon him at a later date, the unusual honor of Doctor of Medicine, ***honoris causa.***

Blackstone Studios, New York

Karl F. Meyer, M.D.

"This young Swiss came to the United States in 1910. He taught pathology and bacteriology at the University of Pennsylvania (1910–1913); and headed the laboratories of the Pennsylvania Live Stock Sanitary Board (1913–1914). In 1914 he found his real future in California, as Professor of Bacteriology and Protozoölogy at the University of California, and in 1915 he joined the staff of the Hooper Foundation for Medical Research of which he became Director in 1924. Since 1920 he has been a consultant to the State Department of Health of California, playing—behind the scenes—a major part in building up a state health department of which this Association is proud. Since 1921 he has been Director of Research for the Western Laboratory of the National Canners Association; and since 1924 has served on the faculty of the University of California Medical School. He has held important lectureships at Harvard and Johns Hopkins; but his professional life has for more than thirty years centered about the great research institution which he has directed with such ability.

"Dr. Meyer's investigations have ranged over a wide field, including comparative pathology and bacteriology, protozoölogy, intestinal infections, immunology, and brucellosis. In recent years he has made contributions along four major lines. His studies of the botulism bacillus and other anaerobes and his other contributions to food technology have had far-reaching influences. His researches on the bacteriology and epidemiology of sylvatic plague have made him one of the world's foremost authorities on this subject. He was the first fully to realize and to emphasize the importance of psittacosis, and not only love-birds but even pigeons throughout the country have cause to dread his name. Most dramatic of all perhaps, was his pioneer discovery of the virus of Western equine encephalomyelitis, from which sprung the recognition of the danger of this disease to man and the part played by our common mosquitoes in its transmission. The first isolation of this virus was made from the head of a horse, cut off by Dr. Meyer who slipped surreptitiously round to the stable for this purpose while his assistant kept the recalcitrant farmer owner, armed with a loaded shotgun, parleying at the front gate.

"The Canadian Mounted Police gets its man; and Karl Meyer got his horse. In every one of the lines of research mentioned above he did not stop at the doors of the laboratory. When he lec-

tured to students, the flood of his oratory left them, at the end of the third hour, faint but still pursuing. He followed his discoveries out into the community. He forced the public to think and to act—to do something about food poisoning and plague, and psittacosis. We honor him tonight not as a brilliant technician alone, but as a great leader in the cause of public health.

"Throughout Dr. Meyer's career, there has run one major and fundamental concept—a concept expressed in one of his addresses under the title 'The Animal Kingdom, a Reservoir of Disease.' This was the key to his researches on plague, on psittacosis, and on encephalomyelitis. The fruitfulness of this conception, and of the training based on comparative pathology and comparative epidemiology, is illuminated by the fact that it was a dominant element in the thinking of two previous Sedgwick Medalists, Smith and Zinsser, and an important factor in the work of three others, McCoy, Park, and Rosenau.

"When William T. Sedgwick published his *Principles of Sanitary Science and the Public Health* in 1902, a sense of the importance of the mammalian carrier and the insect vector was just beginning to dawn. He recognized, in general, that men and animals were the primary sources of the germs of communicable disease; and in the case of malaria and yellow fever the first steps had already been taken. He says 'The importance of the bites and stings or other punctures of the skin by insects, which has long been recognized theoretically, has recently received fresh emphasis and attention owing to the results of investigations upon the hitherto obscure but widespread disease known as malaria.' Two years before, at the 1900 meeting of this Association, Reed and his colleagues had made the first presentation of their findings on yellow fever.

"Just the corner of the curtain had been lifted. Forty years ago we had no certain knowledge about bubonic plague or typhus fever—still less about dairy cattle and horses as reservoirs of brucellosis and encephalomyelitis, or the danger from psittacine birds. Sedgwick's alert and questioning spirit would have rejoiced if he could have looked forward to the control of yellow fever and plague and typhus fever and to the progress made in this war against malaria. On behalf of William T. Sedgwick—as well as of the American Public Health Association—I hand to you, Dr. Meyer, the Sedgwick Medal for 1946 in recognition of your brilliant part in revealing the secrets of diseases transmitted by animals to man and of your vigorous and enlightened service in building up the public health program of the West Coast and of the nation."

. . . . . .

In accepting the award, Dr. Meyer made the following reply:

"It is a great honor and privilege to refresh with you the memory of William Thompson Sedgwick, a supreme teacher, pioneer in physiology and sanitary science, a philosopher on the problems of human relationship, and a zealous public servant.

"This occasion is a particularly fitting one on which again to acknowledge with all the force at our command, his continuous spiritual leadership in teaching, which permeates this Association and the public health movement in America. As heirs of his knowledge and methods, an eminent group of pupils, 'Sedgwick's Boys,' continue to remind us that progress will be made through knowledge. Nearly a century ago, as a forward looking scientist, Professor Sedgwick appreciated fully the function of science as a universal benefactor of humanity. He likewise realized that science would some day be held more or less responsible for human conduct. This time has arrived.

"It is therefore appropriate to recall that he said, 'The remedy for defects of conduct in an age of science is more science. For me the way to salvation through science can only come through more and better science. I fully believe that if we had more complete knowledge, so that the consequences good or bad of every act could be accurately foreseen and foretold; if chance were wholly eliminated and inflexible law stood revealed in its place, much of the evil doing of time—some of which comes from ignorance, some from half knowledge, some from error, but probably most from reliance on trick or chance, with the uncertainty of penalty and the hope of escape from consequences—would never occur.'

"Always ready to serve, he never failed to emphasize that scientists and technicians in public service are servants and not rulers of the people. How, then, can all mankind best be maintained at a level of bodily efficiency and well-being, and how can we, once that minimum has been reached, secure the greatest possibilities for social and intellectual development? This question constantly engaged his mind, and none felt as keenly as did Professor Sedgwick the disastrous consequences of self-satisfied isolation which followed the first world war, and left weaker nations to stagger to their destruction.

"In an introductory address to a series of lectures delivered at the University of California in 1919, which left an indelible imprint on my memory, he said: 'Henceforward, whether we will or no, whether we like it or not, we must have dealings with the European nations. Henceforward, we are an integral part of the world's political family and it has now come home to most of us that the world of our forefathers has disappeared, and that ours is a new world. Together with this goes that shrinkage of the world already referred to which makes the question, Who is my Neighbor? superfluous; for all nations are our neighbors.' Let us strongly hope that these facts, so wisely foreseen by Professor Sedgwick, will be fully realized by the political leaders now deliberating the reconstruction of civilization.

"I accept this medal and the honor conferred upon me by the American Public Health Association, but I do so with a feeling of deep humility because I recognize how great have been the contributions of my colleagues and associates, whose devotion to the cause of saving human life remains an everlasting incentive. Guided by the example and tradition set by the purposeful life of William Thompson Sedgwick, we will go forward together, here and abroad."

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

Gordon L. Anderson, M.D., D.P.H., 227 N. Mitton St., Sarnia, Ontario, Canada, Director, Lambton Health Unit

Herman J. Bennett, M.D., 317 W. 92nd St., New York 25, N. Y., Trainee-Health Officer, New York City Health Dept.

Calmes P. Bishop, M.D., 519 S. Third St., Muskogee, Okla., Director, City-County Health Unit

Revis A. Brannon, Jr., M.D., Southeastern Health District, Lucedale, Miss., Director

John S. Chamblee, M.D., Nash County Health Dept., Nashville, N. C., Director

Edward M. Cohart, M.D., 800 E. 14th St., Brooklyn 30, N. Y., Trainee, Health Officer, New York City Health Dept.

Clara M. Erdelyi, M.D., Leake County Health Dept., Carthage, Miss., Health Officer

Sidney S. **Goldman, M.D.**, 1327 Pine St., Philadelphia, Pa., Acting Senior Medical Officer, State Dept. of Health

James F. **Harrell, M.D.**, Box 249, Bardwell, Ky., Health Officer, Ballard-Carlisle County Health Dept.

Robert D. **Hicks, M.D.**, 102 Moore St., Chester, S. C., Director, York-Chester-Lancaster County

Henry E. **Jenkins, M.D.**, Southside Health Dept., Farmville, Va., Health Officer

Ellsworth H. **John, M.D.**, County Health Dept., Hardinburg, Ky., Health Officer

Floyd **Johnson, M.D.**, Columbus County Health Dept., Whiteville, N. C., Health Officer

Clifford V. **Mason, M.D.**, 576 Callan Ave., San Leandro, Calif., Health Officer, Alameda County Health Dept.

Will M. **Miller, M.D.**, Box 1135, Corsicana, Tex., Acting Director, Corsicana-Navarro County Public Health Unit

Walter J. **Pennell, M.D.**, 367 Main St., Wakefield, Mass., District Health Officer, State Dept. of Health

Maurice L. **Peter, M.D., M.P.H.**, 918 N. Seminole, Okmulgee, Okla., Director, Okmulgee County Health Dept.

Jackson T. **Ramsaur, M.D.**, Rutherford-Polk Dist. Health Dept., Rutherfordton, N. C., District Health Officer

George **Rosen, M.D., Ph.D.**, 285 Riverside Drive, New York 25, N. Y., Junior Health Officer, New York City Health Dept.

Mildred E. **Scott, M.D.**, Box 167, Harrisonburg, Va., Health Officer, Rockingham-Harrisonburg Health Dept.

Raymond E. **Smallwood, M.D.**, 1226 Wilson, Arkadelphia, Ark., Medical Director, Dist. Health Unit 3

Seth E. **Smoot, M.D.**, P. O. Box 41, Provo, Utah, District Health Officer

John E. **Souter, M.D.**, 111½ W. Oklahoma Ave., Guthrie, Okla., Medical Officer, Logan County Health Dept.

Paul M. **Spurney, M.D.**, 3400 Lee Rd., Shaker Heights 20, Ohio, Director of Health

Abram F. **Stanley, M.D.**, Harrison, Ark., Medical Director, Public Health Dist. 15, State Dept. of Public Health

Nemesio **Torres-Munoz, M.D.**, Avenida Ballivian 638, Cochabamba, Bolivia, S. A., Director, Servicio Especial de Profilaxia

Lee E. **Traul, M.D.**, Lawrence Block, Room 12, Bellefontaine, Ohio, Health Commissioner, Logan County General Health Dist.

Loren **Wallin, M.D.**, Wadesboro, N. C., Dist. Health Officer, Anson-Montgomery District Health Dept.

William B. **Wild, M.D., M.P.H.**, Health Dept., Mansfield, Ohio, Health Commissioner, Mansfield and Richland County Health Dept.

Laboratory Section

Ruth R. **Almaden, M.S.**, State Board of Health, Little Rock, Ark., Director of Hygienic Laboratory

Marvin D. **Beery, MDETS**, Fitzsimons General Hospital, Denver, Colo., Instructor, Laboratory Section

Lucile L. **Cheney**, 64 Chapel St., Augusta, Me., Laboratory Technician, State Bureau of Health

Pauline R. **Colmey**, 155 East Lake Rd., Penn Yan, N. Y., Yates County Senior Technician

Lena M. **Conte**, 886 S. Broad St., Trenton, N. J., Bacteriologist, War Dept., Army Medical Center, Washington, D. C.

Helen M. **Fitzgerald**, Research Laboratory, U. S. Marine Hospital, Staten Island 4, N. Y., Secy. to Social Science Analyst, Venereal Disease Research Laboratory

MacDonald **Fulton, Ph.D.**, Bowman Gray School of Medicine, Winston-Salem, N. C., Teacher of Bacteriology

Angelo M. **Gnassi, M.D.**, 130 Wegman Parkway, Jersey City, N. J., Director of Laboratories, Medical Center

Luis Manuel **Gonzalez, Ph.D.**, School of Tropical Medicine, San Juan, Puerto Rico, Asst. Professor of Bacteriology

Ad **Harris**, U. S. Marine Hospital, Staten Island, N. Y., Serologist, Venereal Disease Research Laboratory

Catherine E. **Harris**, 1719 N.E. 18th St., Oklahoma City 5, Okla., Principal Serologist, State Board of Health

Harold C. **Hulme**, Rd. 1, Leavittsburg, Ohio, Teacher, Senior High School, Dept. of Biological Science

Jacqueline B. **Jonkowske**, 119 E. 29th St., New York 16, N. Y., Research Technician, Rockefeller Institute for Medical Research

John F. **Kent, A.M.**, Army Medical Center School, Washington 12, D. C., Chief, Research Section, Division of Serology

Sidney J. **Klein, Ph.D.**, Veterans Administration Hospital, Van Nuys, Calif., Serologist

Edward C. **Knoblock, A.B.**, 1535 East Alameda Ave., Denver, Colo.

Jean E. **Lusk**, 1320 11th St., Douglas, Ariz., Medical Technologist, Douglas City Laboratory

Lois J. **Lynch**, 4 Fiske Ave., Bradford, Pa., Laboratory Technician, Bradford Hospital

Seward E. **Miller, M.D.**, 1396 Emory Rd. N.E., Atlanta, Ga., Director, Division of Laboratory Services, USPHS Communicable Disease Center

Professor Maurice Panisset, 2900 Mount Royal Blvd., School of Hygiene, Montreal, P. Q., Can., Dept. of Bacteriology

Lolita Pannell, 1702 Massachusetts St., Lawrence, Kan., Student, Kansas University

Margaret N. Pickard, M.S., 501 4th Ave., N., Twin Falls, Ida., Senior Bacteriologist, State Dept. of Public Health

Chester W. Read, Rt. 4, Box 111, Watsonville, Calif., Fresh Frozen Foods Co.

Edythe J. Rose, M.A., National Institute of Health, Bethesda 14, Md., Assoc. Bacteriologist

Victor G. Rubenstein, M.D., 849 S. Normandie Ave., Los Angeles 5, Calif., Asst. Professor, Clinical Pathology, U.S.C. Medical School

Maurice Saint-Martin, M.D., 1570 St. Hubert St., Montreal, Que., Canada, Bacteriologist, Ministry of Health

Shivaraj Nandan Prasad Sinha, M.B., D.P.H., 55 Shattuck St., Boston, Mass., Medical Officer of Health, Bihar Public Health Service, India

Richard C. Wadsworth, M.D., 489 State St., Bangor, Me., Assoc. Pathologist, Eastern Maine General Hospital

Ralph H. Weaver, Ph.D., University of Kentucky, Lexington, Ky., Professor of Bacteriology

Stanley E. Wedberg, Ph.D., Univ. of Conn., Storrs, Conn., Asst. Professor of Bacteriology

Carl R. Woodward, Jr., E. R. Squibb & Sons, New Brunswick, N. J., Section Head, Bacteriological Production

Vital Statistics Section

Francis R. Allen, A.M., 521 E. 17th Ave., Tuscaloosa, Ala.

W. V. Charter, D.P.H., Bureau of Medicine and Surgery, Navy Dept., Washington 25, D. C., Deputy Director, Navy Medical Statistics

Lillian R. Freedman, 2515 K. Street, N.W., Washington 7, D. C., Statistician, Childrens Bureau

C. Horace Hamilton, M.S., Box 5428, State College Station, Raleigh, N. C., Head, Dept. of Rural Sociology, North Carolina State College

Harry Lynch, 375 Riverside Drive, New York 25, N. Y., Medical Statistician, Metropolitan Life Insurance Co.

Donovan J. McCune, M.D., The Babies Hospital, 3975 Broadway, New York 32, N. Y., Professor of Pediatrics, College of Physicians and Surgeons, Columbia University

Emma G. Pregnall, 217 Calhoun St., Charleston 17, S. C., Secretary-Clerk, Charleston County Health Dept.

Elizabeth L. Skau, 1629 Columbia Rd., Washington 9, D. C., Statistician, Navy Dept.

Engineering Section

Sidney A. Berkowitz, 4 West Oak St., Arcadia, Fla., Dist. Sanitary Engineer, Southwestern Florida Health District

Claude E. Boles, 514 Edgeland Place, Birmingham 9, Ala., Asst. Chief Sanitary Inspector, Tennessee Coal, Iron and Railroad Co.

Jose P. Bongiovanni, 1018 San Jose, Montevideo, Uruguay, S. A., Chief Engineer, Domestic Sanitary Works

Clarence L. Bradley, 6 Roberts St., Fargo, N. D., Sanitarian, City Health Dept.

Charles E. Brettell, 1770 S.W. 9th St., Miami, Fla., Supervisor of Rodent Control, Dade County Health Unit

Charles R. Brown, North Carolina State Board of Health, Raleigh, N. C., Asst. Director of Typhus Control

Allan T. Butler, 300 Public Safety Bldg., Seattle, Wash., Chief Sanitarian, City Dept. of Public Health

William H. Cranford, 820 West College, Blackwell, Okla., Sanitarian Grade II, Kay County Health Dept.

Herbert W. Davids, M.S., 4 Herbert St., Baldwin, N. Y., Junior Sanitary Engineer, Nassau County Health Dept.

Melvin A. Dobbs, 325 East Broadway, East St. Louis, Ill., Sanitary Engineer, East Side Health District

George H. Eagle, State Dept. of Health, Columbus, Ohio, Asst. Engineer

Bruce R. Ford, M.S., 99 Meadow Lane, Jefferson City, Mo., Intermediate Sanitarian, State Division of Health

Dick P. Hardison, P. O. Box 491, Gainesville, Fla., Food Sanitarian, Alachua County Health Dept.

Robert H. Harmeson, 656 Whitley Ave., Joliet, Ill., Sanitary Engineer, Will County Health Dept.

Ralph S. Howard, Jr., M.S., P. O. Box 38, Albany, Ga., Sanitary Engineer, Dougherty County

Samuel P. Ingram, 1206 West Ave., Austin, Tex., Food Sanitarian, Austin-Travis County Health Unit

George J. Kupchik, M.S., 1350 E. 3rd St., Brooklyn 30, N. Y., Health Inspector, N. Y. City Health Dept.

Earl H. Martin, 3906 N. Jefferson, Midland, Mich., Sanitarian, Midland County Health Dept.

Cyril P. Maughan, 240 S. 2nd E., Preston, Ida., Sanitarian, State Health Dept.

Edwin B. McCary, 614 Chartres St., New Orleans 16, La., Director, Typhus Control Program, New Orleans Health Dept.

Harold W. Merryman, 829 S. 11th St., Corvallis, Ore., Dist. Sanitary Engineer, State Board of Health

John B. Patterson, 801 W. 44th, Vancouver, Wash., Chief Sanitarian, Clark County District Health Dept.

Edward J. Puscas, R.F.D. 1, Collins, Ohio, Sanitarian, Lorain County Board of Health

Andrew R. Secor, River Rd., Scarborough, N. Y., Sanitary Engineer, Westchester County Health Dept.

Leslie K. Sherman, M.S., 747 Mountain Rd., West Hartford, Conn., Senior Sanitary Engineer, State Dept. of Health

A. Ray Small, Health Dept., Lincolnton, N. C., Sanitarian, Catawaba-Lincoln District Health Dept.

Franklin D. Stewart, C.E., State Dept. of Health, Columbus, Ohio, Asst. Chief Engineer

Harold W. Streeter, Old Indian Hill Rd., R.R. 1, Box 192, Cincinnati 27, Ohio, Sanitary Engineer and Director, Water and Sanitation Investigations, USPHS

George E. Symons, Ph.D., 155 E. 44th St., New York 17, N. Y., Assoc. Editor, Water and Sewage Works

John W. Wakefield, 99 Ave. C., Apalachicola, Fla., Assoc. Sanitary Engineer, State Board of Health

Lyle E. Wells, 435 Henrietta Rd., Rochester, N. Y., Director, Monroe County Dept. of Sanitation

Industrial Hygiene Section

Pat Eidschun, B.S., 1523 South Peoria, Tulsa 5, Okla., Counselor of Vocational Rehabilitation, State Dept. of Education

Dorothy Geishecker, 2537 West Argyle St., Chicago 25, Ill., Chemist, Division of Industrial Hygiene

Food and Nutrition Section

Mary J. Angus, M.Sc., 2650 Bowker Ave., Victoria, B. C., Canada, Nutritionist, Provincial Health Dept.

Ercel S. Eppright, Ph.D., 211 Beech, Ames, Iowa, Head, Dept. of Foods and Nutrition, Iowa State College

Angela M. Filios, M.S., Merck & Co., General Sales Dept., Rahway, N. J.

Florence B. Gravelle, 1055 Beacon St., Brookline 46, Mass., Nutritionist, Los Angeles City Health Dept.

Barbara L. Hutchings, 125 E. Baltimore Ave., Clifton Heights, Pa., Industrial Sanitation in Frozen Food Industry

Ancel Keys, Ph.D., Univ. of Minn., Lab. of Physiol. Hygiene, Minneapolis, Minn., Director of Laboratory

Herbert Pollack, M.D., 45 E. 66th St., New York, N. Y., Metabolic Clinic, Mt. Sinai Hospital

John J. Powers, Ph.D., Ohio Agric. Exp. Station, Wooster, Ohio, Asst. Food Technologist

Julia A. Taylor, M.S., 2238 5th Ave., New York 35, N. Y., Nutrition Consultant, New York Tuberculosis and Health Assn.

Virginia B. White, Ph.D., Purdue Univ., School of Home Economics, Lafayette, Ind., Teacher

Maternal and Child Health Section

Beulah Baird, 631 J St., Sacramento, Calif., Public Health Nursing Consultant, State Dept. of Public Health

Dale E. Beverly, 4306 S. Parkway, Chicago, Ill., Attending Physician, Infant Welfare, Chicago Health Dept.

Edwin F. Gouldman, M.D., 38 W. Virginia Ave., Richmond, Calif., Student, University of California School of Public Health

Carlos A. Urueta, M.D., 1488 Chapel St., New Haven, Conn., Student, School of Public Health, Yale Univ.

Public Health Education Section

Alberta Altman, 502 Sixth St., S.W., Washington, D. C., Asst. Chief, Office of Health Information, USPHS

Adelaide P. Brady, M.Ed., Tiburon, Calif., Instructor, Physical Education, Stanford Univ.

James T. Edington, 205 Lincoln St., Sterling, Colo., Field Representative, National Foundation for Infantile Paralysis, Inc.

Jeanette Evans, M.A., 87 Washington Ave., Bridgeport 4, Conn., Public Health Educator, Visiting Nurse Assn.

C. W. Gilchrist, O.B.E., Ed., 228 Sherwood Drive, Ottawa, Canada, Director, Information Services Division, Dept. of National Health and Welfare

Barbra A. Holland, 7383 Lahser Rd., Birmingham, Mich., Physical Education Instructor

William G. Hollister, M.D., 615 N. Wolfe St., Baltimore 5, Md., Student, Mental Hygiene Division, USPHS

G. Eugene Honeycutt, 1309 State St., Emporia, Kans., Field Representative, National Foundation for Infantile Paralysis, Inc.

George A. Kenny, M.S., 347 Tiffany Ave., Warwick Neck, R. I., Student, Harvard School of Public Health

Rosa B. Lewis, M.A., Powhatan, Va., Supervisor of Schools, Powhatan School Board

Effie Maiden, 615 E. 4th St., Charlotte, N. C., Health Educator, City Health Dept.

Joseph F. Nee, Minot Post Office, Scituate, Mass., State Representative, National Foundation for Infantile Paralysis, Inc.

Roy E. Patton, M.A., Box 1135, Enid, Okla., Counselor, Vocational Rehabilitation Division, State Board of Education

Harriet Peat, M.S., 819 N. Calhoun St., Baltimore 17, Md., Asst. Health Educator, Maryland Tuberculosis Assn.

J. T. Reed, Box 68, Durant, Okla., Counselor, Vocational Rehabilitation Division, State Board of Education

Norman D. Render, M.D., State Hospital, Clarinda, Iowa, Superintendent

R. Winfield Smith, M.A., 4611 State Rd., Drexel Hill, Pa., Field Secy., Pennsylvania Tuberculosis Society

Joe Story, M.S., Box 636, Lawton, Okla., Dist. Counselor, Vocational Rehabilitation Division, State Board of Education

Odessa W. Wilson, P. O. Box 536, Farmerville, La., Supervisor of Elementary Classroom Teaching

Public Health Nursing Section

Katharine G. Amberson, M.A., 1790 Broadway, Room 412, NOPHN, New York, N. Y., Nurse Consultant, Joint Public Advisory Service, National League of Nursing Education

Eva M. Bourne, 900 Ohio St., Lawrence, Kans., County Nurse, Lawrence-Douglas County Unit

Bonnie Clarke, R.N., 219 S. Second St., Elkhart, Ind., Supervisor of Public Health Nurses, Elkhart Chapter, American Red Cross

Rose V. Fortuna, R.N., 116 Quincy, Hancock, Mich., Public Health Nurse, USPHS

Iva E. Hensel, 117 S. First St., Princeton, Ill., Orthopedic Nursing Consultant, Division of Services for Crippled Children

Edith M. Herlihy, 22 Gage St., Fitchburg, Mass., Supervising Nurse, State Dept. of Public Health

Gertrude Hess, M.P.H., R.N., 2904 Mildred, Chicago 14, Ill., Student, University of Michigan School of Public Health

Grace Hull, 428 West Ash, Mason, Mich., Hospital Nursing Consultant, State Dept. of Health

Anna J. Kalmanowitz, R.N., 120 E. 39th St., Brooklyn 3, N. Y., Field Public Health Nurse, Joint District Committee

Ruby M. Lee, R.N., M.A., State Board of Health, Little Rock, Ark., Public Health Nursing Consultant, USPHS

Emma Marenchin, R.N., 3128 West 86th St., Cleveland 2, Ohio, Instructor of Public Health, Dept. of Public Health and Welfare

Evelyn W. Martin, R.N., Box 1961, Greenville, S. C., Asst. District Supervising Nurse, State Board of Health

Mildred L. Mouw, Health Dept., Rochester, Minn., Supervising Nurse, Rochester-Olmsted County Health Unit

Hazel U. Murray, R.N., Christian Ave., Stony Brook, N. Y., Staff Nurse and County Public Health Nurse, Suffolk County Dept. of Health

Wilma H. Pestal, 6050 Hillman Ave., Cleveland, Ohio, Student, Frances Payne Bolton School of Nursing

Doris E. Roberts, 201 Allegheny Ave., Towson, Md., Senior Asst. Nurse Officer (R), USPHS, Tuberculosis Control Division

Ruby B. Wyatt, R.N., 308 North Stiles, Houston 11, Tex., Field Nurse, City Public Health Nursing Division

Leota P. Young, R.N., 31-12 106th St., Corona, N. Y., Administrative Supervisor, New York City Dept. of Health

Epidemiology Section

John B. Bolin, 77 Fairway Blvd., Columbus 9, Ohio, Head, Venereal Disease Investigations, State Dept. of Health

Theodore G. Duncan, M.D., City Hall, Division of Health, Cleveland, Ohio, Chief, Sub-division of Communicable Diseases

Nicholas J. Fiumara, M.D., 48 Arborough Rd., Roslindale, Mass., Dist. Health Officer, State Dept. of Public Health

Joseph H. Gerber, M.D., Woodmont, Conn., Student, Dept. of Public Health, Yale Univ.

School Health Section

John L. Bracken, A.M., 7500 Maryland Ave., Clayton 5, Mo., Superintendent, Clayton Public Schools

Fred V. Hein, M.S., 535 N. Dearborn, Chicago 10, Ill., Consultant in Health and Physical Fitness, Health Education Bureau, American Medical Assn.

Eloice Kilgore, M.Ed., 706 N.W. 29th St., Oklahoma City, Okla., Counselor, Vocational Rehabilitation Division, State Board of Education

Elizabeth A. Lockwood, M.P.H., 695 Huntington Ave., Boston 15, Mass., Research Fellow in Nutrition, Harvard School of Public Health

Emily A. Pratt, M.D., 1226 Smith Tower, Seattle 4, Wash., Head, Conservation of Hearing Section, State Dept. of Health

Margaret L. Rickert, R.N., 33 Yale Terrace, Linden, N. J., Head Nurse, Board of Education

Edward L. Tarpley, M.D., 700 Broad St., Nashville, Tenn., Director, School Health Service, City Public Schools

Bernadine Zimmerman, R.N., 400 Dubose Ave., San Francisco, Calif., School Nurse, Jefferson School District

Dental Health Section

Harold Berk, D.D.S., 471 Commonwealth Ave., Boston 15, Mass., Asst. Chief, Dental Dept., Forsyth Dental Infirmary for Children

Matthew Besdine, D.D.S., 1182 Dean St., Brooklyn, N. Y., Dentist

B. Holly Broadbent, D.D.S., Western Reserve University, School of Medicine, Cleveland, Ohio, Chairman, The Bolton Fund

Edward H. Bruening, D.D.S., 4402 N. Camino Real, Tucson, Ariz., Head, Dental Dept., Tucson Public Schools

Raeburn R. Davenport, D.M.D., 164 Newbury St., Boston 16, Mass., Advisor, Walpole Massachusetts School Dental Clinic

James B. Davidson, D.D.S., 1325 Foulkrod St., Philadelphia 24, Pa., Oral Surgeon, Frankford Hospital

Carl Friedman, D.D.S., 507 Fulton Ave., Hempstead, N. Y., Dentist

Samuel S. Herman, D.D.S., 18 Walden St., Revere, Mass., Dental Examining Officer, Personnel Centre, Camp Beale

Donald H. Miller, D.D.S., 109 Walnut, Elmira, N. Y., Chairman, Council on Dental Health, New York State Dental Society

Edmond F. de Monseigle, D.D.S., 711 Grand Ave., Asbury Park, N. J., Dental Inspector, N. J. Board of Health

George R. Moore, D.D.S., School of Dentistry, Univ. of Michigan, Ann Arbor, Mich., Consultant in Orthodontics, State Health Dept.

Fred A. Richmond, D.D.S., 1008 Huron Bldg., Kansas City 10, Kans., Dentist

Chester J. Schultz, D.D.S., 10465 Carnegie Ave., Cleveland 6, Ohio, Supervisor of Filling Clinics, Division of Health, City of Cleveland

Joseph A. Silvia, D.M.D., 7 Inman Square, Cambridge, Mass., Dentist in charge, Maverick Dispensary

Maurice Sitomer, D.D.S., 4 Raymond Ave., Poughkeepsie, N. Y., Dentist

W. James Taub, D.D.S., 609 Western Ave., Albany 3, N. Y., Dentist, New York State Vocational Institution

John A. Turner, D.D.S., 1218 Girard St., N.W., Washington, D. C., Faculty, College of Dentistry, Howard University

Unaffiliated

Cozette Hapney, 2306–41st St., N.W., Apt. 102, Washington 7, D. C., Research Assoc., Subcommittee on Medical Care, American Public Health Assn.

Rutledge W. Howard, M.D., Lederle Laboratories, 30 Rockefeller Plaza, New York 20, N. Y., Director of Professional Service

Martin Litwack, D.V.M., 1014 Canterbury Rd., Raleigh, N. C., Veterinarian, Wake County Health Dept.

Helen R. MacGregor, J.D., Governor's Office, Sacramento, Calif., Private Secretary to the Governor

Orville E. May, Ph.D., 310 North Ave., Atlanta, Ga., Chemist, The Coca-Cola Company

R. W. McComas, M.D., General Delivery, Brighton, Mich., Surgeon, USPHS

Donald F. Simpson, M.A., USPHS, Washington 14, D. C., Personnel Methods Analyst, State Personnel Administration Unit

DECEASED MEMBERS

Louis J. Frank, Woodmere, N. Y., Elected Member 1924, Unaffiliated

Leroy U. Gardner, M.D., Saranac Lake, N. Y., Elected Member 1931, Elected Fellow 1940, Industrial Hygiene Section

J. Earle Parker, Waban, Mass., Elected Member 1944, Unaffiliated

Eugene C. Peck, M.D., M.P.H., Leonardtown, Md., Elected Member 1932, Maternal and Child Health Section

Mrs. Ruby S. Sandall, Tremonton, Utah, Elected Member 1945, Public Health Nursing Section

EMPLOYMENT SERVICE

The following pages present information for those seeking qualified public health personnel and for those seeking positions in public health.

This is a service of the Association conducted without expense to the employer or employee.

Address all correspondence to the Employment Service, A.P.H.A., 1790 Broadway, New York 19, N. Y., unless otherwise specified.

Positions Available

(Supplemental to list in November Journal)

Wanted: Industrial Hygienists. Positions open for personnel with either engineering, chemical, or related scientific training, in state industrial hygiene division. All positions covered by state merit system. Monthly salaries $280–$400 depending on qualifications. Write Division of Industrial Hygiene, Georgia State Health Dept., Atlanta 3, Ga.

Wanted: Two public health staff nurses for full-time health unit, generalized program. Beginning salary $220. Experience required. Also, one public health nurse supervisor. Beginning salary $250. Degree desirable. Write Director J. T. Duncan, M.D., Box 110, Visalia, Calif.

Wanted: Virologist, for full-time research. Must have thorough experience in laboratory techniques of virus disease research. Salary $3,500–$6,000, depending on training and experience. Write **Box G,** Employment Service, A.P.H.A.

Wanted: Health officer or pediatrician with administrative and public health experience, to serve as assistant health officer in charge of Maternal and Child Health of King County, Washington. Salary $6,000 plus travel. Write Dr. J. D. Fouts, Health Officer, King County Dept. of Public Health, Seattle 4, Wash.

Wanted: Physician for Director of Division of Venereal Disease Control in large county health department. Several large clinics in operation. Must be able to direct and supervise a complete V.D. Control Program. Specialized training and experience in this work required. One with public health training and experience preferred. Position under Civil Service. Starting salary $6,900 plus travel allowance. Maximum salary $7,800. Write, giving full particulars and earliest date available, Director, Wayne County Health Dept., Henry Ruff Road, Eloise, Mich.

Wanted: Associate Secretary for Health Division, Council of Social Agencies of midwestern city; duties are those involved in a community program of coördination and planning, with particular reference to the public health field. Graduation from an accredited college or university and experience, including some executive experience in the health field essential. Salary $3,400–$5,400. Write **Box E,** Employment Service, A.P.H.A.

Wanted: Industrial Hygiene Chemist Class III. Salary $260–$310 per mo. Must be a graduate of an accredited college with a major in chemistry. Three years' experience in professional analytical chemistry and research required. Write Industrial Hygiene Unit, Wisconson State Board of Health, State Office Bldg., Madison 2, Wisc.

Wanted: Sanitarian and dairy inspector. Must be trained and experienced in all phases of inspection work. Department furnishes Pickup and pays all expenses of operation and repair. Write State Dept. of Agriculture, Room 310, Capitol Bldg., Cheyenne, Wyo.

Wanted: Bacteriologist with equivalent rating of junior grade, A.B. or B.S. degree, and at least one year experience in a public health laboratory, to work in County Laboratory, acting in capacity of a State Branch Laboratory. Permanent position, salary $2,180 per annum. Write Arlington County Health Department, P. O. Box 151, Arlington, Va.

Wanted: Assistant Bacteriologist-Serologist for health department laboratory. College degree. Salary $2,600. Write Charles A. Neafie, M.D., Director of Public Health, Pontiac 15, Mich.

Wanted: Supervisor for Public Health Nurses. Minimum requirement, certificate in public health nursing. Salary $3,200. Transportation provided. Write Charles A. Neafie, M.D., Director of Public Health, Pontiac 15, Mich.

Wanted: Director of city health department in large western city, state capital. Position under Merit System. One year graduate study in public health required. Salary $6,000–$7,200. Write **Box A,** Employment Service, A.P.H.A.

Wanted: **Three public health nurses** for staff positions in City Bureau of Health, serving population of 45,000: (1) One white nurse with course in public health and experience, $190 per month. (2) One white nurse with course and no experience, $156.90 per month, or without course or experience $143.75. (3) One Negro nurse without course or experience, $143.75. Write S. D. Sturkie, M.D., Director of Public Welfare, City Hall Annex, Lynchburg, Va.

Wanted: **Public Health Nurse** with degree and public health experience for administrative position in newly organized cancer program. Salary $3,100. Furnish own car, gas and oil furnished. Also public health nurse with degree and public health experience for educational program. Must own car. Salary $3,100. Write **Box B**, Employment Service, A.P.H.A.

Wanted: **Supervisor for Visiting Nurses' Assn.** in California, 20 minutes from San Francisco. Chest Agency in Medical Welfare & Retirement fund. Salary $3,000. Must have had adequate experience in field work, supervision and a degree in Public Health Nursing. Also, public health nurses for staff positions in generalized public health nursing program are wanted in Oakland, Calif. Salary $200–$215 per month. Must have California R.N. and theory in Public Health Nursing. Write Director, Oakland Visiting Nurse Association, 121 East 11th Street, Oakland 6, Calif.

Wanted: **Well-qualified public health nurse** with experience, in a joint three-county service in Oregon. Salary $240 per month. Liberal car allowance. Write Division of Public Health Nursing, Oregon State Board of Health, 1022 S.W. 11th Avenue, Portland 5, Ore.

Wanted: **Tuberculosis Clinician.** Duties include organizing and supervising tuberculosis diagnostic and pneumothorax clinics throughout the state, organizing community and industrial x-ray surveys, interpreting x-ray films, and assisting with other related tuberculosis control activities. Must be eligible for West Virginia license. Salary $420–$500 per month, plus travel. Write West Virginia State Dept. of Health, Charleston 5, W. Va.

Wanted: **Sanitary Engineer or Sanitarian** for newly established Health Department in resort area of Southeastern Michigan. Salary $3,300 plus mileage. Write H. C. Huntley, M.D., Director, Lenawee County Health Dept., Adrian, Mich.

Wanted: **Two public health nurses** in the Stanislaus County Health Dept., California. Salaries start at $220 per month; cars furnished. Write George F. O'Brien, M.D., M.S.P.H., Health Officer, 2410 H Street, P. O. Box 1412, Modesto, Calif.

Wanted: **Dental Hygienists** for Child Dental Health Program. Salary $2,168.28; Write U.S.P.H.S., Dental Section, Washington 11, D. C.

Wanted: **City Health Officer** in the State of North Carolina. Qualified candidates should contact **Box A-1**, Employment Service, A.P.H.A.

Wanted: **Bacteriologist**, New England public health laboratory. College degree plus 2 years' working experience (1 year in public health laboratory), or 2 years' college training plus 4 years' experience required. Starting salary $2,580, maximum $3,120. Write **Box B-1**, Employment Service, A.P.H.A.

Wanted: **Epidemiologist** who will also serve as Director of Division of Acute Communicable Diseases Control of Department of Public Health, Seattle, Wash. Beginning salary $6,000 plus reimbursement for necessary travel. Write Emil E. Palmquist, M.D., Director of Public Health, 300 Public Safety Bldg., Seattle 4, Wash.

Wanted: **Public health nurses** for generalized nursing program. Salary range $210–$240 per month. Under civil service 40 hour week, vacation and sick leave privileges. Write Director of Public Health Nursing, City of Seattle, 504 County-City Bldg., Seattle 4, Wash

Wanted: **Public Health Engineer** to serve as Director of the Division of Sanitation of the Seattle Department of Public Health. This is a newly created position to unify the sanitation program under one person's leadership, and which in the past has been divided into four divisions, i.e., meat, milk, plumbing inspection, and general sanitation. Beginning salary $440 per month. Civil service position with vacation, sick leave and retirement privileges. An automobile for travel will be furnished. Write Emil E. Palmquist, M.D., Director of Public Health, 300 Public Safety Bldg., Seattle 4, Wash.

Wanted: **Laboratory Technician** in health department laboratory to make routine bacteriological water analyses and bacteriological and chemical analyses of dairy products. College degree, with at least one year of bacteriology and a year of organic and inorganic chemistry required. No experience necessary. Age limit, 30 years. Women only. Salary $150 monthly or more, depending on quali-

fications. Opportunity for advancement. Write W. Howard Brown, Director, Food and Laboratory Division, Jacksonville Health Department, 940 Main St., Jacksonville 2, Fla.

Wanted: Junior Bacteriologist-Serologist. College degree with major in a science and some practical laboratory experience necessary. Starting salary $185 per month. Write E. V. Thiehoff, M.D., Peoria Dept. of Health, City Hall, Peoria, Ill.

Hawaii Board of Health Wants:

One **Psychiatrist** to direct the bureau of mental hygiene. (Salary: $645.00–$728.33, plus $45 monthly bonus.) Certification or eligible for certification by the American Board of Psychiatry and Neurology as a psychiatrist is required.

One **Child Psychiatrist** to assist in the direction of the bureau of mental hygiene and to head the child psychiatry program. (Salary: $645.00–$728.33, plus $45 monthly bonus.) Graduation from a medical school of recognized standing and supplemented by two years of specialized training in child psychiatry; four years' experience in psychiatry of which two years shall be in child psychiatry.

One **Public Health Veterinarian** to plan and supervise a program of food inspection and control in the division of pure food and drugs. (Salary: $362.08–$436.67, plus $45 monthly bonus.) Graduation from a recognized school of veterinary medicine with training in food inspection and control; two years' experience in veterinary medicine of which one year shall be in food inspection and control.

One **Public Health Statistician** to assist in the direction of the bureau of vital statistics and to head the section of public health statistics. (Salary: $295.42–$368.02, plus $45 monthly bonus.) Three years of responsible statistical experience, of which one year shall be in public health statistics, and graduation from a university of recognized standing with specialization in statistics, supplemented by graduate work in public health statistics. Write Civil Service Commission, Territory of Hawaii, 206 Hale Auhau, Honolulu 2, Hawaii. (Use air mail, 5 cents.)

Wanted: Health Officer for Saint Joseph, Mo. Graduation in medicine from a Grade A medical school and not less than two years of full-time experience in public health work, or, one year of such full-time experience and the completion of a course in public health of not less than one year in residence at a recognized institution of learning required. Write R. S. Minton, M.D., President of the Common Council, Saint Joseph, Mo.

Wanted: Two Public Health Nurses for county health department in rural California coastal county midway between San Francisco and Los Angeles. Population 45,000; largest urban population 10,000. Excellent generalized nursing service. Starting salary $215 monthly. Car furnished or 6¢ per mile. Write County Health Dept., San Luis Obispo, Calif.

Wanted: Several county health officers. Salary $6,000–$7,200. M.P.H. in addition to M.D. desirable to begin; under Merit System; permanent. Write Mr. A. T. Johnson, Personnel Officer, Oregon State Board of Health, 1022 S.W. 11th Avenue, Portland 5, Ore.

Wanted: Director of public health dentistry. Salary $4,750 beginning. Liberal travel and expense allowance. D.D.S. and M.P.H. necessary. Write Mr. A. T. Johnson, Personnel Officer, Oregon State Board of Health, 1022 S.W. 11th Avenue, Portland 5, Ore.

Wanted: Epidemiologist with responsibility for supervising Department of Vital Statistics. Salary $4,878. Write Cincinnati Health Department, City Hall, Cincinnati 2, Ohio.

POSITIONS WANTED

Executive with long service in public health education and public relations in a large state health department available after January 1. Experienced in editorial work and in planning and executing special programs such as accident prevention, diphtheria immunization, convention planning. Part- or full-time. Write **Box A-525**, Employment Service, A.P.H.A.

Bacteriologist - Immunologist desires permanent position in medical or public health bacteriology and immunology. Doctorate from Eastern university. Several years' research and teaching experience. Veteran. Write Box **L-495**, Employment Service, A.P.H.A.

Bacteriologist and Parasitologist with 4 years' experience as sanitarian and over 3 years' experience in Army medical and sanitary bacteriology, recently 1st Lt., Sanitary Corps, AUS, seeks position in public health laboratory or research in

industrial bacteriology. Write **E-490**, Employment Service, A.P.H.A.

Parasitologist, M.S., female, five years' experience in research and routine laboratory work also in allied biological fields. Write **L-500**, Employment Service, A.P.H.A.

Health **Educator** experienced in community organization work plus university teaching and adult education. Wishes position in community organization work or with special community project in health education. Write Box **H-520**, Employment Service, A.P.H.A.

Health **Educator**, female, age 37, Negro, with three years' experience in Health Education, twelve years' experience in social work and community organization; capable of working with entire community; considerable experience working with racial and religious minorities. Write **Box H-522**, Employment Service, A.P.H.A.

Writer, experienced, college graduate, woman, general medical background, several scientific translations from German. Four years' research for official agency on history of state hospitals. Also experienced in organizing social service for physically handicapped. Desires position in editorial work, library research, translation, and administrative personnel work. Write **Box H-526**, Employment Service, A.P.H.A.

Public Health Editor, experienced in preparing health pamphlets, movie and slide films, articles and speeches. Seven years' experience in curriculum building and teacher training in adult education and 10 years' experience in teaching English. Write **Box H-524**, Employment Service, A.P.H.A.

Fellowships in Medical Research

Dr. Thomas Parran, Surgeon General of the U. S. Public Health Service, announces approximately 120 one year fellowships in medical research open to men and women who are graduate science students.

The National Cancer Institute, a division of the National Institute of Health, has funds to train approximately 30 physicians in the diagnosis and treatment of cancer. Doctors wishing to specialize in this field may be appointed as trainees and be assigned to authorized institutions.

The National Institute of Health offers research fellowships to graduates of accredited colleges who have majored in biology, chemistry, dentistry, entomology, medicine, physics, and other scientific fields. Senior research fellowships are awarded at a yearly stipend of $3,000 to those who hold a Ph.D. degree in one of the specified scientific subjects. Junior fellows receive $2,400 annually and must hold an M.S. degree or have completed the equivalent of such a degree in postgraduate study. Fellowships may be renewed for a second year. Applications for fellowships and traineeships should be sent to the Director, National Institute of Health, Bethesda, Md.

The U. S. Public Health Service also administers fellowships for health personnel from other American republics and the Philippine Islands. Applications for these fellowships should be sent to The Surgeon General, U. S. Public Health Service, Washington 25, D. C.

Fellowships for the Training of Health Educators

The U. S. Public Health Service announces that fellowships leading to a Master's degree in Public Health in the field of health education are again being offered. Candidates must be U. S. citizens between 22 and 40 years of age, must hold a bachelor's degree from a recognized college or university, and must be able to meet the entrance requirements of the accredited school of public health of their choice.

In addition to the degree, courses in the biological sciences, sociology and education may be required. Training in public speaking, journalism, psychology, and work in public health or a related field are considered desirable qualifications.

Tuition, travel expenses for field training and a monthly stipend of $100 will be provided out of funds furnished by the National Foundation for Infantile Paralysis. The year's training which begins with the 1947 fall term, consists of 8 or 9 months of academic work and 3 months of supervised field experience.

Veterans are encouraged to apply and will be paid the difference between the allowance under the G.I. Bill of Rights and the monthly stipend of $100. Employees of local and state health departments are not eligible since Federal grants-in-aid are already available for such training purposes.

Application blanks may be obtained by writing the Surgeon General, United States Public Health Service, Washington 25, D. C., and must be filed prior to March 15, 1947.

NEWS FROM THE FIELD

FIRST UNRRA TRANSFER TO WORLD HEALTH ORGANIZATION

On October 22, the United Nations World Health Organization took over from UNRRA the latter's epidemiological functions. This is the first of UNRRA's activities to be transferred to the new organization. By an agreement signed between Director General LaGuardia and Dr. G. B. Chisholm, Executive Secretary of the Interim Health Commission, the latter organization will now be responsible for the collection and dissemination of information to all nations on outbreaks of epidemic diseases to guide them in enforcing international quarantines. Progress has also been made in arranging for the transfers of other UNRRA health activities.

TENNESSEE PUBLIC HEALTH ASSOCIATION ORGANIZES STATISTICAL DIVISION

At a recent meeting of the Tennessee Public Health Association, in response to a petition of members, a Statistical Section was organized. The first meeting of the Section was planned by Dr. Ruth Rice Puffer, Director of the Statistical Service of the Tennessee Department of Public Health, Nashville. Papers on the statistical program at the Vanderbilt University School of Medicine, of the Tennessee State Department of Health, and of other state health departments were given respectively by Dr. Paul Densen, Assistant Professor of Preventive Medicine and Public Health; Ann Dillon, Statistician of the Tennessee Department of Health, and Ellen B. Whiteman, Statistician of the Commonwealth Fund. William F. Elkin, Statistician of the Oak Ridge Department of Health, discussed public health statistics in Oak Ridge.

The following officers of the Section were elected:

Chairman—Dr. Paul M. Densen, Vanderbilt University School of Medicine

Vice-Chairman—Margaret Rice, Tennessee Valley Authority

Secretary—Ann Dillon, Tennessee Department of Public Health

COMPULSORY PASTEURIZATION OF MILK

A news release for October, 1946, of the U. S. Public Health Service, Milk and Food Section of the Sanitary Engineering Division, lists those municipalities with compulsory pasteurization of milk. This "List of American Municipalities With Compulsory Pasteurization" cites 192 municipalities that require pasteurization of all marketed milk. Only certified raw milk is allowed in 277 communities with three others allowing certified raw milk only on a physician's prescription. It is to be noted that of the 472 listings, 241 of them are in Massachusetts or New York State. Fifteen states are not represented at all.

GRANTS FOR ENVIRONMENTAL SANITATION RESEARCH

According to a recent news release from the U. S. Public Health Service, grants for research work in environmental sanitation are available. These are made possible through the grant-in-aid program for research in medical and allied fields administered by the Research Grants Division, National Institute of Health, U. S. Public Health Service. Grants can be made to universities, hospitals, laboratories, and other public or private institutions and to individuals. Applications are referred to a study section composed of experts in the field covered by the pro-

posed work. The news release referred to above states:

> The Study Section (Sanitation) defines environmental sanitation broadly as including not only the older phases of activity, such as water, waste, and milk and food sanitation, but also the so-called "newer phases" of sanitation, such as atmospheric pollution, housing, air disinfection, and home accidents.

Further details and application forms can be obtained from John Andrews, Sanitary Engineer (R), U. S. Public Health Service, 19th and Constitution Avenue, N.W., Washington 25, D. C. Mr. Andrews is executive secretary of the Sanitation Study Section.

YALE PLANS TO TEACH INDUSTRIAL MEDICINE

Dr. Francis G. Blake, Dean of the Yale University School of Medicine, has announced the establishment, at Yale, of an Institute of Occupational Medicine and Hygiene for work in the field of Industrial Medicine. The Institute will be headed by Dr. Ronald F. Buchan, newly appointed Assistant Professor of Industrial Medicine, who will serve as clinical director of the Institute.

Primary aims of the Institute,

1. Training of medical students and industrial physicians, on the ground that occupational medicine is a specialty.
2. Special graduate instruction available to graduate students in medicine, nursing, public health, and engineering.
3. Research in occupational medicine and hygiene.
4. Consultation. The Institute will be designed to assist industrial concerns on certain practical questions in the same fashion as the clinicians in the School of Medicine assist their colleagues in the practice of medicine.

UNION HEALTH CENTER IN CHINA

The Willis F. Pierce Memorial Hospital in Foochow, China, capital of Fukien province, has established a department of public health to be known as the Christian Union Health Center. The health center will engage particularly in the fields of maternal and child health and of school health and in training Chinese health workers in these fields. This will be done in coöperation with the Chinese government's own health program and in areas which the government, by reason of shortage of personnel and funds, has not yet reached. It will operate from a health center but will emphasize the long neglected field of rural health. This will be done by means of a mobile unit equipped with car and trailer. The unit will act as an experimental and demonstration team with emphasis on quality rather than quantity of work.

RESEARCH ON HYPERTENSION

The U. S. Public Health Service has awarded the Washington University School of Medicine, St. Louis, a grant of $270,000 for support of research on hypertension. The grant will cover five years, $70,000 to be spent the first year and $50,000 each year thereafter. The work will be under the direction of Dr. Henry A. Schroeder, who comes from the Hospital of the Rockefeller Institute for Medical Research, where he worked with Dr. Donald D. Van Slyke. Dr. Schroeder has been active in the study of hypertension in the past, having described an enzyme in the kidney which affects blood pressure.

HEALTH, LABOR AND INDUSTRIES PROGRAM

A new coöperative program between the Washington State Department of Health and the State Department of Labor and Industries to better health and safety conditions for industrial workers has been functioning satisfactorily, according to Dr. Arthur L. Ringle, State Director of Health. Dr. Lloyd M. Farner, head of the Industrial and Adult Hygiene Section of the Department of Health, explained that the agreement was entered into because of overlapping responsibilities of the two departments, particularly in the

field of occupational disease control. Under provisions of the coöperative program the Department of Health is responsible for study and evaluation of industrial hygiene hazards, while the enforcement of compliance with recommendations is the responsibility of the Department of Labor and Industries. The Department of Health is now assisting by providing professional opinion as to whether it is reasonable to suspect that individual cases may be of occupational origin, supplying occupational disease consultant services and providing factual information to panels of physicians selected to assist in judging contested cases. Dr. Ringle said that under the new program provision has been made for earlier reporting of occupational diseases, the details of the reporting system to be announced later. The coöperative program has been approved by the Washington State Medical Association as well as by representatives of industry and labor.

HEALTH COUNCIL FORMED IN PORTLAND, OREGON

The Multnomah County Oregon Health Council was organized July 25, when representatives of 15 participating groups elected officers and executive committee members and outlined plans for the future operation of the council. The project is under the auspices of the Multnomah County Medical Society. Dr. Blair Holcomb, Portland, was elected Chairman of the Council which will "concern itself with any or all aspects of community health, . . . including education, coördination, investigation, planning and the making of recommendations with respect to those aspects of community health with which the Council may become concerned."

CHAMBER OF COMMERCE OPPOSES ANTIVIVISECTION LEGISLATION

Research on animals for the development of life-saving medical knowledge has been endorsed by the Chamber of Commerce of the United States in a statement of policy released recently by Howard Strong, secretary of the Health Advisory Council of the Chamber. Mr. Strong announced the policy as the result of a referendum vote of member organizations. The statement submitted for the vote is as follows: "In view of the great progress that has been made in preventive and curative medicine and surgery through animal research and the prospect of even greater progress in the future, the National Chamber is unalterably opposed to the prohibition of this scientific procedure. Such a prohibition would seriously hamper all medical progress." Result of the vote was 2,424 organizations in favor of the statement, 18 against. Represented in the poll were slightly over a million business men. Mr. Strong, in a letter to Dr. Anton J. Carlson, Chicago, president of the National Society for Medical Research, announced the outcome of the Chamber of Commerce referendum and said "we are therefore now in a position to present the chamber's opposition to antivivisection legislation wherever such legislation rears its head and, when advisable and possible, a representative of the Chamber can appear in opposition."

ILLINOIS TRAINING PROGRAM FOR PUBLIC HEALTH PHYSICIANS

"It is anticipated that Illinois will experience a continuous, long-term need for well trained public health physicians." With this declaration the Illinois State Health Department announces a program to provide medical public health personnel with both field and academic training.

The training will consist of an orientation period under the direct supervision of experienced public health physicians of six months' work in the various divisions of the State Health Department and in one or more of the

local county, multi-county, or city health departments. A year of postgraduate work in one of the schools accredited by the American Public Health Association for the degree of M.P.H. follows satisfactory completion of this period.

A monthly stipend, tuition, and traveling and maintenance expenses while away from headquarters will be paid during training. Graduates of an approved medical school with at least one year of rotating interneship in an approved hospital, with license to practise, or eligible, in Illinois, and preferably under 35 years of age are desired. Selection is made through personal interview by a committee of the State Health Department on the basis of qualifications and in accordance with the provisions of the State Civil Service Law. Trainees must agree to remain in public health work in Illinois for at least two years.

Physicians interested in this program should apply to the Director, Illinois Department of Public Health, Springfield.

WEST VIRGINIA CANCER SOCIETY CHANGES NAME

The West Virginia Division of the American Cancer Society was reorganized at a meeting at Parkersburg, August 1, and the name changed to the West Virginia Cancer Society, Inc. New officers include Dr. Chauncey B. Wright, Huntington, chairman; Dr. Thomas F. E. Dess, Keyser, vice chairman; Mr. Charles Lively, Charleston, secretary, and Homer Gebhardt, Huntington, treasurer.

TRAINING PROGRAM OFFERED BY WISCONSIN STATE BOARD OF HEALTH

A training allowance of $360 per month is being offered by the Wisconsin State Board of Health for postgraduate training in public health. This stipend, plus tuition and the cost of travel, is being offered to physicians selected as District Health Officers under the civil service requirements of the state. One or two full semesters of training at a university having an accredited public health course will be offered to those who qualify for district health officer positions.

NATHAN GOLDBLATT MEMORIAL HOSPITAL FOR CANCER TREATMENT AND RESEARCH

Gift of a million dollars by the Goldblatt Brothers Foundation to establish "The Nathan Goldblatt Memorial Hospital" as the center of the University of Chicago's extensive program of cancer treatment and research was announced by Ernest C. Colwell, president of the university.

As a clinical center, the hospital will be devoted exclusively to treatment of cancer and other neoplastic diseases. The hospital will be built to connect with the surgical section of Billings Hospital of the university clinics. The Nathan Goldblatt Memorial will be the only university hospital in the country with the entire staff engaged full time in cancer treatment and research.

The hospital also will be the focus of the University of Chicago's Committee on Cancer and its associated Committee on Normal and Neoplastic Growth, which coördinate research on cancer in nine clinical and basic science departments. In addition to the present research facilities, significant additional resources will be added soon by the laboratories of the university's Institute of Radiobiology and Biophysics and its Institute of Nuclear Studies. Both institutes already have complete staffs.

HARVARD OFFERS NEW GRADUATE DEGREES IN HYGIENE

James Stevens Simmons, M.D., Dr.P.H., Dean of the Harvard School of Public Health, recently announced

that in addition to the degrees of M.P.H. and Dr.P.H., the Harvard School of Public Health now offers the degrees of Master of Science in Hygiene and Doctor of Science in Hygiene, open to research students.

PERSONALS

Central States

ARTHUR W. FRISCH, M.D., Associate Professor of Bacteriology and Clinical Pathology, Wayne University College of Medicine, Detroit, has resigned to become Associate Professor of Bacteriology at the University of Oregon School of Medicine, Portland. Dr. Frisch has been a member of the Wayne faculty since 1937, returning to the staff in February after more than 3 years' service in the U. S. Army.

CHANGES IN HEALTH PERSONNEL IN INDIANA:

HARRY P. ROSS, M.D., Richmond, has been named Secretary of the Richmond Board of Health, succeeding the late GEORGE B. HUNT, M.D. ARTHUR J. WHALLON, M.D., Richmond, has been appointed a Member of the Board.

LUKE W. FRAME, M.D.,† Washington, has been appointed Medical Director of the branch office in Washington of the State Board of Health with jurisdiction over southwestern Indiana. This district is one of five set up under a decentralization program by the State Board of Health.

CARL C. KUEHN, M.D., Indianapolis, has been named Director of the Division of Tuberculosis Control of the Indiana State Board of Health, succeeding HOLLAND THOMPSON, M.D.

CHANGES IN HEALTH PERSONNEL IN KANSAS:

ALICE M. FINLEY, R.N.,† who for the last year has been associated with the Alabama State Health Department as Supervisor of Nurses in Macon County, and Acting Director of Tuskegee School of Nurse Midwifery, has returned to Kansas to serve as generalized consultant nurse for the Kansas State Board of Health. Miss Finley formerly served in this capacity before going to Alabama.

ELIZABETH SUTCLIFFE, M.P.H., a Kansas nurse who returned to the state September 1, has accepted the position of Public Health Nursing Instructor at the University of Kansas Hospitals, a newly created position. This is the first nursing school in the state to offer an integrated basic course in public health nursing.

ROELOF SANTING, M.D., Gladwin, Mich., director of the Shiawasee County Health Department, has been appointed to a similar position for the Lansing Department of Health. He succeeds FLOYD R. TOWN, M.D.,† who resigned after holding the position for 4 years.

FLOYD R. TOWN, M.D.,† formerly Director of the Department of Public Health, Lansing, Mich., has been appointed Health Officer for Bremerton-Kitsap County, Wash.

Eastern States

DANIEL BERGSMA, M.D., M.P.H.,* has been appointed Deputy Director of Health, Department of Health, State of New Jersey, effective July 1, 1946.

R. V. BROKAW, M.D.,* has been appointed Chief of the Division of Cancer Control of the New Jersey

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* Fellow, A.P.H.A.
† Member, A.P.H.A.

State Department of Health, effective November 1.

JOHN H. CAULEY, M.D., M.P.H.,† has been appointed Health Commissioner of the City of Boston, Mass., succeeding FRED BAILEY, M.D. Dr. Cauley has served the department for more than 15 years, most recently as Director of the Bureau of Communicable Diseases.

WALTER CLARKE, M.D.,† of New York, N. Y., Executive Director of the American Social Hygiene Association, was recently awarded a Certificate of Appreciation from the War Department for his wartime service as Consultant to the Secretary of War on Venereal Disease Control.

ROBERT W. CULBERT, M.D.,† after 2 years in the Navy as a Lieutenant Commander, has returned to his former position as Chief of the Division of School Health Services, New York City Department of Health.

ERNEST D. EASTON,† who has served for a number of years as Executive Secretary of the New Jersey Tuberculosis League, has announced his retirement, effective January 1, 1947.

DOMINICK J. LACOVARA, M.D.,† has been appointed Resident Psychiatrist of the Matteawan State Hospital, Beacon, N. Y., as of September 1. He was recently associated with the Harlem Valley State Hospital, Wingdale, N. Y. Dr. Lacovara is also presently Consultant in Psychiatry at Craig House, Beacon, N. Y.

KENNETH S. LANDAUER, M.D.,† has been appointed Director of the Division of Medical Care of the National Foundation for Infantile Paralysis. Before this appointment, he has been the Director of the New York State Reconstruction Home at West Haverstraw, N. Y. Dr. Landauer will coördinate the organization's year-round program of Medical Care and Treatment of Infantile Paralysis victims under supervision of HART E. VAN RIPER, M.D.,† Washington, D. C., Medical Director.

ESMOND R. LONG, M.D.,* Director of the Henry Phipps Institute for Study, Treatment and Prevention of Tuberculosis, Philadelphia, Pa., has been appointed Director of Research of the National Tuberculosis Association. Dr. Long has served as Chief Consultant on Tuberculosis in the Office of the Surgeon General of the Army from July, 1942, to March, 1946, with the rank of Colonel.

ANTHONY J. MANZELLA, M.D., Buffalo, N. Y., has been appointed Deputy Commissioner of Health and full-time Director of the Division of Communicable Diseases of the Buffalo Department of Health, effective July 1.

WILLIAM J. ORCHARD,* General Manager of Wallace and Tiernan Company, Inc., was signally honored by the Federation of Sewage Works Association during the Annual Conference held October 7–9. Mr. Orchard was the recipient of the Federation's highest honor, that of Honorary Membership. This distinction was conferred in recognition of the counsel and untiring energy he has given the affairs of the Federation since its inception.

ROBERT E. PLUNKETT, M.D.,† General Superintendent of Tuberculosis hospitals, New York State Department of Health, has been appointed a member of The National Research Council Division of Medical Sciences' Committee on Tuberculosis.

WALTER R. SCOTT,† Registrar for the New Jersey State Department of Health at Trenton, recently completed 41 years of service with the department.

JOHN CRAYTON SNYDER, M.D., has been appointed Professor of Public

* Fellow, A.P.H.A.
† Member, A.P.H.A.

Health Bacteriology at the Harvard School of Public Health. Dr. Snyder was graduated in medicine from Harvard in 1935 and has been connected with the field staff of the International Health Division, Rockefeller Foundation, for studies of typhus fever which he has continued in assignments to the U. S. Army.

HARRY M. WEAVER, PH.D.,† Acting Director of Research for the National Foundation for Infantile Paralysis, has been named Director of Research for the organization. Previously on the faculty of Wayne University College of Medicine, Detroit, Dr. Weaver joined the National Foundation staff last February as Assistant to the Medical Director.

ALLEN O. WHIPPLE, M.D., has been announced as Clinical Director of the Memorial Hospital, New York, for the Treatment of Cancer and Allied Diseases. Before taking up his duties at the Memorial Hospital, February 1, 1947, Dr. Whipple will go to England to study the cancer activities there and visit the American University of Beirut, Lebanon, of which he is a trustee, and act as consultant in the reorganization of the Medical Center there. Dr. Whipple retired September 30 from the Columbia University College of Physicians and Surgeons with the title of Valentine Mott Professor Emeritus of Surgery.

Southern States

JUSTIN M. ANDREWS, SC.D.,* who served during the war as a Colonel in the Sanitary Corps, AUS, was recently commissioned as Senior Scientist (R) with the U. S. Public Health Service and has been assigned as Deputy Officer in charge of the Communicable Disease Center, Atlanta, Ga.

LUDWIG ANIGSTEIN, M.D., PH.D.,† of the University of Texas School of Medicine has completed a 4 months lecture tour in Poland as UNRRA lecturer on communicable diseases. Dr. Anigstein has returned from his leave of absence and resumed research work and duties as Professor of Preventive Medicine.

C. H. CONNELL, PH.D.,† recently a Lieutenant Colonel in the Sanitary Corp, Army of the United States, is now with the Department of Preventive Medicine and Public Health, University of Texas Medical Branch, Galveston, Tex. Prior to his military activity, Dr. Connell was connected with the Department of Municipal and Sanitary Engineering, A. & M. College of Texas, College Station, Tex., as Associate Professor.

FREDERICK H. DOWNS,† Principal Sanitarian, Alabama State Health Department, Division of Inspection, was the recipient of the King Haakon VII Freedom Medal recently, in ceremonies presided over by Governor Chauncey Sparks, in Montgomery, Ala. The citation presented to Mr. Downs read in part: "outstanding services rendered to the cause of Norway during the liberation." Mr. Downs, then Maj. Downs, Sn.C., was one of the public health officers assigned to Norway shortly after liberation of that country.

CHANGES IN HEALTH PERSONNEL IN FLORIDA:

FRITZ A. BRINK, M.D., long associated with public health in Florida, recently resigned as County Health Officer of Jefferson County.

BURDETTE L. ARMS, M.D.,* formerly State Health Officer in Florida but recently employed in public health work in Maine, has been appointed County Health Officer of Jefferson

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* Fellow, A.P.H.A.
† Member, A.P.H.A.

County with headquarters at Monticello.

CHARLES J. ROEHM, M.D., recently released from the A.U.S., has accepted the position of Local Health Officer in the Unit composed of Okaloosa, Walton, and Holmes Counties. His chief headquarters will be at DeFuniak Springs.

BRUCE UNDERWOOD, M.D.,† recently Health Officer in Henderson County, Ky., has been appointed Local Health Officer in the Leon County Health Department with headquarters at Tallahassee.

JAMES B. HALL, M.D., has been appointed Health Officer in the Southeastern Florida Health District with headquarters at Vero Beach, effective October 15.

FERN A. GOULDING,* formerly with the American National Red Cross, Washington, D. C., has been appointed Coordinator of Community Experience, at the School of Nursing, Adelphi College, Garden City, N. Y., where she will coöperate with county public health agencies and the New York City Department of Welfare.

PAUL V. JOLIET, M.D., has been appointed Director of the Division of Tuberculosis Control, Kansas State Board of Health, filling the vacancy created by the resignation of HOMER L. HIEBERT, M.D.† Dr. Joliet who has been carrying on tuberculosis work for the U. S. Public Health Service, Bethesda, Md., is on loan to Kansas by the U. S. Public Health Service.

CHANGES IN HEALTH PERSONNEL IN KENTUCKY:

RICHARD B. FULKS, M.D.,† Barbourville, has resigned as Health Officer for Knox, Laurel, and Whitley Counties, to become Field Director of the Division of County Health Work of the Kentucky State Department of Health, with offices in Louisville.

WILLIAM F. LAMB, M.D., Russelville, has been appointed Deputy Director of Health of Louisville and Jefferson County, succeeding GRADIE R. ROWNTREE, M.D.,* who is on a year's leave of absence. Dr. Lamb will carry this work in addition to his activities as Venereal Disease Control Officer in the Department.

EDWIN B. UNDERWOOD, M.D., has resigned as Health Officer of Union County, effective September 1.

JOHN R. PATE, M.D.,† who has been connected with the State Serological Laboratory and responsible for the Supervision of Private and Public Laboratories in Kentucky operating under the martial law, has been appointed Director of the State Division of Venereal Disease. He succeeds DR. WILLIAM R. LAMB of Russelville.

DUDLEY A. REEKIE, M.D., U. S. Public Health Service, has been appointed Health Officer of Lexington-Fayette County, effective August 1.

EDWARD N. MAXWELL, M.D., Assistant Surgeon, Tuberculosis Control Division, U. S. Public Health Service, who has been working at the North Carolina Sanatorium, Sanatorium, N. C., has been named Acting Director of the Division of Tuberculosis, Kentucky State Department of Health, succeeding RUSSELL E. TEAGUE, M.D., Louisville, Director of the Division who has joined the Public Health Service. Dr. Teague will be assigned to the First District Office of the Public Health Service in New York and will be in charge of Tuberculosis Control for a group of Eastern States.

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* Fellow, A.P.H.A.
† Member, A.P.H.A.

WILBUR V. BRADSHAW, JR.,† Lawrenceburg, has resigned as Health Director of Anderson and Shelby Counties to become Assistant Director and Chief of the Division of Communicable Disease of the San Antonio (Texas) Department of Health.

EDWARD G. MCGAVRAN, M.D.,* Health Officer of St. Louis County, Clayton, Mo., has been appointed Professor and Head of the new Department of Public Health and Preventive Medicine at the University of Kansas School of Medicine, Kansas City. He will also serve as education consultant in Public Health and Preventive Medicine for the Kansas State Board of Health.

THOMAS MCPHERSON BROWN, M.D., has been appointed Adjunct Clinical Professor of Medicine at the George Washington University School of Medicine, Washington, D. C. Formerly, he has been Assistant Professor of Medicine, Johns Hopkins University School of Medicine, Baltimore, Md. During the war he served 42 months in the Pacific theater as a Consultant in Infectious and Tropical Diseases and later was a Special Consultant to the Surgeon General, Washington, D. C.

THOMAS T. MACKIE, M.D.,† who recently has served in the Office of the Surgeon General, U. S. Army, has been appointed Professor of Preventive Medicine and Chairman of the Department of Medicine at the Bowman Gray School of Medicine, Winston-Salem, N. C.

WALTER A. PLECKER, M.D.,* Richmond, Va., has resigned as Director of the Virginia State Bureau of Vital Statistics to devote more of his time to the racial study of Indians and Negroes. Dr. Plecker, who is 85 years of age, joined the State Bureau in 1912.

MORRIS POLLARD, D.V.M.,† until recently Chief of the Veterinary and Virus Section, Eighth Service Command Laboratory, Fort Sam Houston, Tex., has accepted a position as Assistant Professor of Preventive Medicine and Director of the Virus Laboratory, University of Texas Medical Branch. Prior to his commission with the Army, Dr. Pollard served on the staff of the Animal Disease Station, National Research Center, Beltsville, Md.

Western States

CHANGES IN HEALTH PERSONNEL IN CALIFORNIA:

WILLIAM E. TURNER, M.D.,† San Jose, has been named Health Officer of Santa Clara County, succeeding CECIL M. BURCHFIEL, M.D., San Jose, who will devote his entire time to private practice.

MERLE E. COSAND, M.D., formerly of Carbondale, Ill., has been named Health Officer of San Bernardino County to succeed WALTER W. FENTON, M.D., San Bernardino, who returned July 1.

JAMES E. DRAKE, M.D.,† has retired as Director of Health and Public Schools of Spokane, Wash., a position he has held for twenty-nine years with the exception of two years' army service in World War II.

EDYTHE C. HERSHEY, M.D.,* Helena, Mont., Head of the State Maternal and Child Health Division and Crippled Children's Service for the last 8 years has resigned to become Regional Medical Consultant for the U. S. Children's Bureau with headquarters in Dallas, Tex.

RAYMOND KAISER, M.D., San Francisco, Calif., has been appointed Chief of the Bureau of Communicable Diseases, California Department of Public Health, effective August 12. Dr. Kaiser has recently

* Fellow, A.P.H.A.
† Member, A.P.H.A.

been Consulting Epidemiologist for the states in District Number 5, U. S. Public Health Service, with headquarters in San Francisco.

SAMUEL M. WISHIK, M.D.,† has recently been appointed as Chief of the Division for Physically Handicapped Children in the New York City Department of Health. He is a well trained New York City pediatrician who has recently had wide experience as Director of Maternal and Child Health and Crippled Children's Services in the Territory of Hawaii, as well as Medical Director of the Honolulu Poliomyelitis Hospital.

Foreign

MYRON P. RUDOLPH, COL., M.C.,† U. S. Army, has joined the staff of the U. S. Seventh Army as Deputy Surgeon stationed at Atlanta, Ga. His last previous assignment was with the Office of Military Government for Germany stationed in Berlin as Health Officer in the Public Health and Welfare Section.

BRIG. GEN. JOHN A. ROGERS, who has just retired from the regular Army Medical Corps after many years of service, has been appointed Managing Director of the Illinois division of the American Cancer Society, effective September 10. General Rogers served during World War II as Chief Surgeon of the First Army, organizing and directing all medical activities of the Normandy invasion and the campaign of the First Army through France, Belgium, Luxembourg, and Germany.

Death

CHARLES H. BOISSEVAIN, M.D., Research Professor in Biology at Colorado College, Colorado Springs, died recently.

* Fellow, A.P.H.A.
† Member, A.P.H.A.

CONFERENCES AND DATES

American Medical Association—43rd Annual Congress on Medical Education and Licensure. Palmer House, Chicago, Ill. February 10–11, 1947.

Child Study Association of America—Annual Conference. Hotel Roosevelt, New York, N. Y. March 10, 1947.

National Dairy Council. Atlantic City, N. J. January 29–31, 1947.

National Society for Crippled Children and Adults. Chicago, Ill. December 9–11.

American Public Health Association—75th Annual Meeting. Atlantic City, N. J. Week of September 22, 1947.

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Publications of the A.P.H.A.

An Appraisal Method for Measuring the Quality of Housing: A Yardstick for Health Officers, Housing Officials and Planners. Part I. Nature and Uses of the Method. 1945. 71 pp. $1.00.

Control of Communicable Diseases, The. 6th ed., 1945. Size 4¼" x 7¼". 149 pp. $.35.

Diagnostic Procedures and Reagents. Technics for the Laboratory Diagnosis and Control of the Communicable Diseases. 2nd ed., 1945. $4.00.

Employment Opportunities in Public Health. 1945. 30 pp. Free.

Health Practice Indices. A collection of charts showing the range of accomplishment in various fields of community health service. 1945. 87 pp. Free.

Membership Directory. 1946. (Free to A.P.H.A. members). $5.00.

Methods for Determining Lead in Air and in Biological Materials. 1944. 41 pp. $.75.

Occupational Lead Exposure and Lead Poisoning. 1943. 67 pp. $.75.

Panum on Measles. By P. L. Panum (translation from the Danish). Delta Omega ed., 1940. 111 pp. $2.50.

Public Health—A Career with a Future. 1946. 29 pp. $.10.

Shellfish and Shellfish Waters, Recommended Methods of Procedure for Bacteriological Examination of. 1944. 12 pp. $.25.

Spanish Summary of 8th edition (1941) of Standard Methods for the Examination of Dairy Products. 1945. 52 pp. Free to Latin American countries. $.10 in the United States.

Standard Methods for the Examination of Dairy Products—Microbiological, Bioassay and Chemical. 8th ed., 1941. 288 pp. Paper, $1.75.

Standard Methods for the Examination of Water and Sewage. 9th ed., 1946. 286 pp. $4.00.
Physical and chemical examination of water and sewage, microscopical examination of water and bacteriological examination of water.

Survey Form for Milk Laboratories. Indicating Conformity with Standard Methods for the Examination of Dairy Products (8th ed.). May, 1944. Single copies 10¢; 50 copies $1.00; 100 copies $1.50; 1,000 copies $10.00.

Swimming Pools and Other Public Bathing Places, Recommended Practice for Design, Equipment and Operation of. 1942. 56 pp. $.50.

Transactions of the Eighth Institute on Public Health Education (1941). 1942. $1.50.

Vital Statistics Directory. Compiled by the Vital Statistics Section. 3d ed., 1945. $.75.

Reprints from the American Journal of Public Health

Changing Challenges of Public Health. C.-E. A. Winslow. [March, 1945.] 8 pp. 15c.

Content and Administration of a Medical Care Program. Six explanatory papers by Joseph W. Mountin, I. S. Falk, Nathan Sinai, J. Roy Hege, Graham L. Davis, George St. J. Perrott, and the Official Statement on Medical Care in a National Health Program. [December, 1944.] 40 pp. 25c.

Current Progress in Sterilization of Air. Stuart Mudd. [June, 1944.] 12 pp. 15c.

Desirable Minimum Functions and Organization Principles for Health Activities. An official Declaration of the American Public Health Association. [1943.] 12 pp. Single copies free. Three or more copies 5c each.

How to Find What Health Education Materials You're Looking For. [Aug., 1944.] 4 pp. 10c.

Improvement of Local Housing Regulation Under the Law. [Nov., 1942.] 16 pp. 25c.

Laboratory Methods Used in Determining the Value of Sulfadiazine as a Mass Prophylactic Against Meningococcic Infections. By Colonel Dwight M. Kuhns, M.C., USA, and Captain Harry A. Feldman, M.C., AUS. [December, 1943.] 8 pp. 10c.

Landmarks of 1944. Six papers by Abel Wolman, Wilton L. Halverson, William P. Shepard, Hugh R. Leavell, C.-E. A. Winslow, Louis I. Dublin. [January, 1945.] 28 pp. 25c.

Medical Care in a National Health Program. An Official Statement of the American Public Health Association Adopted October 4, 1944. [December, 1944.] 6 pp. Single copies free. Five or more copies 5c each.

Protection of Water and Food Supplies in An Emergency. G. E. Arnold. [Oct., 1942.] 8 pp. 15c.

Pyrex Suspensions in Turbidimetric and Colorimetric Determinations: Standards of Comparison for Bacterial Suspensions and in the Resazurin Test. By Francis J. Hallinan. [February, 1943.] 4 pp. 10c.

Surveys of the Nutrition of Populations. John B. Youmans, E. White Patton, and Ruth Kern. [December, 1942 and January, 1943.] 24 pp. Uncovered 20c, covered 25c.

Typhoid Vaccine Studies: Revaccination and Duration of Immunity. By Don Longfellow and George F. Luippold. [Nov., 1940.] 7 pp. 15c.

Ventilation and Atmospheric Pollution. E. R. Hayhurst, Chairman. [July, 1943.] 7 pp. Uncovered 15c, covered 25c.

Vitamin B Complex. II. Status of Assay Methods and Need of These Substances by Man. [July, 1944.] 12 pp. 25c.

For Free Distribution Bibliography on Public Health and Allied Subjects, 1946 (24th Ed.). 28 pp. Brief Description of the American Public Health Association.

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